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THE MANCHESTER FLORA

BY

LEO. H. GRINDON.

A COMPANION TO

WALKS & WILD FLOWERS.

R. LANCTON. STEET. TYP.

CONSIDER THE LILIES OF THE FIELD.

THE

MANCHESTER FLORA:

A DESCRIPTIVE LIST OF THE PLANTS GROWING WILD WITHIN EIGHTEEN MILES OF MANCHESTER,

WITH

NOTICES OF THE PLANTS COMMONLY CULTIVATED IN GARDENS;

PRECEDED BY AN

INTRODUCTION TO BOTANY.

BY

LEO HARTLEY GRINDON,

LECTURER ON BOTANY AT THE ROYAL SCHOOL OF MEDICINE, MANCHESTER; AUTHOR OF "MANCHESTER WALKS AND WILD-FLOWERS;" "LIFE, ITS NATURE, VARIETIES, AND PHENOMENA;" "EMBLEMS," ETC.

WITH NUMEROUS WOOD-CUT ILLUSTRATIONS.

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"CONSIDER THE LILIES OF THE FIELD."

LONDON:
WILLIAM WHITE, 36, BLOOMSBURY.
MANCHESTER AND ALL BOOKSELLERS.
1859.

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CAVE AND SEVER, PRINTERS, PALATINE BUILDINGS,
HUNT'S BANK, MANCHESTER.

DEDICATED

TO

JOSEPH SIDEBOTHAM,

In admiration of his talents as a successful student of Nature in all its variety, and of Botany in particular; and with the warmest feelings of manly affection my heart can entertain towards him, as the proved friend of twenty years.

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PREFACE.

This book is written for persons fond of nature, and especially of flowers, trees, and gardens, but who have not sufficient leisure to study Botany minutely, though ardently wishful to learn such portions of that pleasing science as are useful, practical, and easily at command. It begins with a general Introduction to Botany; then comes a key by which the name of any wild-flower of the neighbourhood may quickly be ascertained; this is followed by a second key, telling the names of Trees by the shapes and other peculiarities of their leaves; and lastly, there is a complete descriptive list of the plants indigenous to the district, with particulars as to where they grow, when they are in blossom, and other matters considered interesting or useful to be added. My great aim has been to make everything plain, describing things with as few technical terms as possible, so that, with a proper exercise of attention on the part of the student, the book may be a complete and perfectly intelligible guide. That there are plenty of books professing the same object, I am well aware; but with scarcely an exception, they are like ladders deficient in the lower steps. In the present volume it has been endeavoured to supply that deficiency, and thus render the means of access at once

MAY 1930

complete and inviting. A detailed account of the plan of the work will be found on pages 52 to 55 of the Introduction, along with "Instructions how to use this Book." Here, accordingly, I need not go further into it, but simply refer the reader to the pages in question. Let those Instructions be abided by, and the youngest botanist will find himself at home in it directly. The large number of woodcuts will also very materially aid his progress. They are almost wholly the work of local artists, doing great credit to Mr. R. Langton, Mr. W. Morton, and Mr. J. W. Harland. The elegant title-page is the work of the first-named.

While making the book simple, due regard has been paid to Botany as a noble Science. In this respect, the medical student, the physiologist, and the floriculturist, will all find it valuable, and calculated to aid them in many of the most important branches of their pursuits. No work is in existence where the idea and compass of the Families, or "Natural Orders" of plants, is exhibited more fully for practical purposes. The arcana of Vegetable Physiology, and of the minuter structure of plants, including matters that require the microscope, occupy only a subordinate place. They come as a fine supplement to Field Botany, but are not indispensable to it. The student who would master these subjects, will find the works of Dr. Balfour eminently well adapted to his purpose.

The situations and modes of access to the various woods and moors, valleys and cloughs, referred to in this volume, are described in its little companion, "Manchester Walks and Wild-flowers," published simultaneously, and intended to introduce to the picturesque beauty of the district, while the present one scientifically examines the particular contents. It is one of the great charms and rewards of Botany that we are allured by it into sweet and delicious rural spots, such as the rarest and choicest wild-flowers love to grow in. The same little volume may be consulted for a portraiture of the peculiar advantages of a knowledge of Botany.

A work of this design, to be made complete and accurate, even approximately, needs the coöperation of many observers. No man can possibly explore every nook and corner of a district six-and-thirty miles across, at every season of the year, and view it under every new aspect induced by cultivation and of atmospheric changes, nor can he pretend to compile a list of its wild-flowers single-handed. He may give a praiseworthy list of his own observations, but not more. While preparing these pages, I have sought the aid, accordingly, of most of the best practical botanists in and about Manchester, and have now the pleasure of at once pointing to the agreeable results that come of friendly union for the purposes of science, and of expressing my gratitude to those who have supplied me with information. My thanks are especially due to Mr. James Percival, jun., President of the Lancashire Botanists' Society; to Mr. Joseph Evans, of Boothstown, President of the Tyldesley Local Society; to Mr. Isaac Williamson, President of the Stockport Botanical Society; to Mr. John Shaw, of Eccles, and to Mr. Richard Hampson, of Little Hulton, who have enabled me to enrich the volume with a copiousness of authority that could not possibly have strengthened it without their aid. I have the highest pleasure also in recording my indebtedness to my old companions in the woods and fields, Mr. Joseph Sidebotham and Mr. Ferris, whose warm and manly hearts have cast sunshine on my life, both botanical and social; also to Professor Williamson, Mr. Stone, of the Royal School of Medicine; Mr. Edward Stone, Mr. Worthington, Mr. William Hunt, Mr. R. Hunt, Mr. Holland, of Mobberley; Mr. Knight, Mr. T. Browning, Mr. and Mrs. Brownell, of Lymm; Mr. Thomas Coward, Mr. Cornforth, Mr. [illegible] Stansfield, of Todmorden; Mr. Nowell, of the same place, and many others, some, it is true, not yet scientific botanists in the full significance of the term, but animated, every one of them, by a deep and clear-seeing love of the charms of nature, such as qualifies to discern beauties and valuable facts where to the indifferent and incurious "all is barren."

Intended especially for the district eighteen miles round Manchester, the work is not useless *beyond* that limit. Not until a perfectly different geological condition of surface is reached, such as that of Derbyshire and the limestone parts of Yorkshire, is there any material change in the character of the Flora, or any considerable addition to it; the book will serve therefore as a botanical guide very generally. The plants of Southport, Blackpool, Southshore, and other places on the coast, which are now almost a part of Manchester, are enumerated and described in the Appendix.

I have merely to add, that I shall be glad to supply information as a private friend to any young botanist who may desire it.

85, Rumford Street, Manchester,
March 28th, 1859.

INTRODUCTION.

Botany is the science which considers the nature of Plants,—how they are constructed, what they are composed of, the circumstances of their life and growth, what they are good for, the countries and places they inhabit, their various and charming beauty, along with many other curious and interesting facts, such as render the study of it exceedingly pleasant and instructive, both to young people and old, at all seasons of the year, and wherever we may go.

There are thousands of different kinds of plants. Some grow on land; others in the water, and of these latter not a few belong to the sea. Many lift their heads high into the air, and throw out beautiful and spreading branches, so as to form trees, which in many cases, when autumn arrives, are loaded with fruit; other kinds are so small and delicate, that in order to see them plainly, we must use a microscope. Between these two extremes there are multitudes of intermediate size, comprising garden flowers, wild flowers, shrubs, vegetables fit to eat, weeds, moss, and whatever else forms part of the green mantle of the earth. The whole of them receive the botanist's attention, and reward him with something useful and satisfactory to know.

The individuals constituting this vast assemblage have, in every case, their peculiar features. Just as the elephant, the rabbit, and the glossy rook are distinguished among animals by their peculiar shape, habits, and colour, so are plants distinguishable from one another by the variety in their leaves, flowers, stems, roots, and seeds. Every one knows how different a camellia is from a daisy, and a sprig of parsley from a red-berried bough of Christmas holly;—every one is familiar with the grass of the green fields, so soft to the foot, so cheerful and refreshing to the eye, and sees for himself, without any

need of a teacher, how different it is, both in make and stature, from oaks and poplars. What all people thus do partially and vaguely, the botanist does minutely and completely. He investigates the precise nature of the differences between plant and plant, and, finding these out, is enabled to discriminate the several kinds with accuracy, then to name and classify them, and ascertain how many sorts there really are. For although, when we look at plants in the mass, they seem diversified without end,

"——————— Beyond the power
Of botanist to number up their tribes,"

it is not so in reality. It is known to within a dozen how many kinds of wild-flowers grow in England, how many in France, how many in Italy,—how many in every country that has been diligently and skilfully explored; and in course of time the whole vegetable offspring of our planet will no doubt be reckoned up, and an account of it be printed. The work is already half accomplished.

To learn how to distinguish plants, and to identify those we have seen before, and to qualify ourselves to give the reasons how and why we know them again, and are sure about them, is the first thing, accordingly, that we have to do when we would become botanists. It is not enough to remember a plant by its general aspect, or to say of a lily, for instance, that it is white, and smells sweet. A hundred other flowers, which are not lilies, are white and fragrant, so that the description goes for nothing unless we can follow it up with an intelligible account of the shape and structure of the plant which will not only be correct in regard to the lily, and apply to nothing else, but convey a fair notion of the flower to a person who has never seen one. This is no difficult matter, every plant in the world being stamped, as already said, with peculiarities which, if they do not render it unique, serve at least to give it character and physiognomy. All the parts of plants supply these signs and tokens, though some more immediately than others. The Flower and Fruit, as the loveliest and noblest, and the parts to which all the aims and energies of the plant are directed from the first moment, naturally stand foremost. Next in importance come the leaves, then the stem and inferior members, the value of each part, as a witness to identity, gradually diminishing in the degree that it is coarser and less perishable. Everywhere in nature, that which most powerfully characterises a thing is its most fragile part, and however frequently renewed, like the sparkle of a diamond, is the quickest to come and go.

But it seldom happens that any one part by itself is absolutely enough whereby to recognise a plant. A single circumstance suffices in the case of the Sundew, which is told at a glance by the curious crimson hairs that sprout like eyelashes from the edges of its leaves; and again, in the case of the Ice-plant, which is sprinkled over its whole surface with glittering gems like hoarfrost; but for the identification of plants in general, we need the concurrent testimony of many parts. The reason of this is the close resemblance which subsists among trees and flowers, the likenesses they bear to one another being, if possible, even more wonderful than their differences. Just as there are classes and tribes of animals, the members of which correspond more or less obviously, as the cat with the tiger, and the wolf with the fox, so are there tribes and families among plants. The Ferns constitute one family, the Grasses another, the Palm-trees a third, the Balsam-trees a fourth. The distinguishing marks of a plant are thus of two sorts:—First, those which it possesses in common with many others; secondly, the private and personal ones which pertain exclusively to itself. Both must be attended to; but with a little practice we get accustomed to the former kind, and are left at leisure to devote ourselves entirely to the private and personal marks. Half the Manchester wild-flowers belong to no more than ten families, a hundred species to eight others, and the bulk of the remainder happen to be so singularly formed, that they stand as distinct and individualised as islands out in the sea. No one having once seen it, can forget the Grass of Parnassus, that lovely milk-white autumn flower, with honey-cups shaped like little hands, opened, and a bead of gold at the tip of every finger; nor the True-love, from the bosom of whose four large oval leaves rises a solitary green blossom of perfect symmetry, its parts, except the solitary purple berry, like the leaves, in even fours, a combination, so far as we know, without a parallel—as true love always was and will be. Attention to families immensely facilitates the learning of species; just as from careful observation of species in the first place, we discover what is the nature of a family. When, for example, by studying the twenty kinds of common hayfield grass, we have got the Grass-family pretty distinctly before the mind, we can walk at our ease among their beautiful and bashful cousins in the woods, and none withhold their name and nature from our curiosity.

The great charm of learning the kinds or species of plants, consists in the pleasant intimacy into which it brings us with Nature. Quick

to identify its manifold lovely objects, we no longer look at it as at the faces of the people in a strange town, but with the happy feeling of being at home, and among companions. The great value of learning the families, on the other hand, or rather the fine correlative advantage, each pursuit bearing upon and augmenting the success of its fellow, lies in the illustration which plants cast upon one another. For agreement in structure implies, to a considerable extent, similarity also in properties and uses. When we find a plant bearing a flower composed of four distinct petals, arranged in the form of a cross, and having certain peculiarities in the internal parts (explained in the following pages), we may presume that that plant is wholesome,—not necessarily agreeable to the tongue, but devoid of anything deleterious. The turnip, the cauliflower, water-cresses, and many other esteemed vegetables, belong to this family, any member of which, however great a stranger, or found for the first time by an emigrant in some back settlement, may be eaten with confidence, provided it be juicy and palatable. With the Nightshade-family it is the reverse. Here we must expect venom, cruelty, and even death. Every one has heard of the Deadly nightshade, that malignant plant which hangs out its tempting berries to the imminent peril of those who eat. It is proper to remark, however, that families which contain poisonous species, are not upon that account noxious in every case; the rest of the family may be harmless, and here and there even wholesome. Making all allowance for this, a great point is still gained in knowing where we are safe, and where we are probably in danger. Similarly, and further illustrating how largely structure and particular properties go together, the Poppy-family is narcotic, the Buttercup-family acrid, the Myrtle-family aromatic, the Gentian-family bitter, and, in medicine, usefully tonic. Other families are remarkable for the strong fibres of their stalks, their mucilage, their sourness, their colouring matters, and so on, though always with the limitation mentioned in the case of the poisonous plants; and many and most valuable have been the discoveries made among their different species by the light of the great principle these facts exemplify. This is not the only reward. A great and noble aim always wins variety of recompense. In studying the families of plants, our eyes are opened not only to matters of bodily interest, or such as have relation to food, clothing, and medicine, but to that grand and wonderful concord and consanguinity of things which far more than the bare fact of their existence declares so plainly the wisdom and love of Him who made

them. The beginning of our contemplation of Nature must always and necessarily be devoted to *differences;* as we ascend, we find that the highest and most beautiful part of knowledge is that which traces *resemblances*, and that resemblances resolve at last into unity, as the scattered trees of the plain, surveyed from the mountain-top, become a forest, and fill the eye as a single leaf.

Let us now proceed to consider the parts of which plants are composed, and by the peculiarities of which they are distinguished and associated. It must be premised that plants are either "perfect" or "imperfect," or, to speak more correctly, "simple" and "composite," since nothing in nature is absolutely imperfect, but everything modelled after a type that is perfect in its own way. The difference in its objects as regards structure, is merely that of greater or less complexity. "Perfect" or "composite" plants are those in which all or nearly all the parts ever entering into the fabric of trees and flowers, are present in high and beautiful development, a special organ being appropriated to every different function. The chief criterion is the presence of a Blossom, formed in the way presently to be described; in practice, indeed, this is the only infallible test, for occasionally, even where blossoms are present, the other portions of the structure are of exceedingly low development, whereas none of the plants comprised in the great division called "Imperfect" ever produce blossoms such as we refer to. "Perfect" or "composite" plants form the great mass of the *conspicuous* vegetation of our earth. With a few exceptions, the members of the other great class are inconspicuous, people in general scarcely knowing of their existence. They are replete with wonderful beauty nevertheless, delighting the true lover of nature not more with their delicate and singular forms, than with the simplicity of their organization, competent as it is to the performance of every one of the offices which in Perfect plants devolve on as many servitors. We shall take the "perfect" division first, as naturally most attractive to taste and fancy, and opening the pleasantest avenues to botanical knowledge.

However large and complex a plant may be, and whether tree or herb, its parts are all resolvable into these five:—

THE ROOT,
THE STEM,
THE LEAVES,
THE FLOWER,
THE FRUIT OR SEED.

Some of these parts often bear curious appendages, such as hairs, thorns, prickles, and tendrils; but there is never any other distinct member, and the tallest tree is only a repetition of them over and over again. Not that the whole five are always present, even in perfect plants. The mistletoe has no true root, the cowslip no true stem, the cactus no true leaves. But there are few plants in which we may not find the greater portion, under some shape or other, when we have learned what strange disguises they are prone to assume. For if Nature seem playful in the myriad shapes of her rosy sea-shells, and in the plumage of her innumerable bright birds, no less gaily does she amuse herself here.

To make everything clear and precise, it is necessary that we now begin to use particular terms,—not "hard" ones, but merely unaccustomed, like the names of new acquaintances, which yet in a week or two become as familiar as oldest friends'. Botanical terms are often thought particularly difficult and numerous. It may be so; but Botany can be studied and enjoyed in spite of them. In the present volume as few as possible will be introduced, and none without explanation, either in the text, or in the shape of a drawing alongside, or in the glossary at the end of the book. Technical terms, it must be remembered, cannot be dispensed with, if we would master a subject. Every branch of knowledge has a language of its own, and it is quite a mistake to suppose that Botany can be made an exception. The simple fact of its variety and beauty implies a vocabulary to match, just as a large and populous country implies in its towns and cities a map full of names of places. To attempt to dispense with technical terms altogether, would be indeed as little complimentary to the intelligence of the student, as hindering to his real progress. A few select ones are invaluable. Those which will be found in the present volume are so exact, so expressive, so easy to learn, and so indifferently translateable into words of colloquial speech, that it would be a far greater pity to leave them out than it will be troublesome for the learner to make them his own. They have not to be learned all at once, but one by one, as they are wanted and become interesting. They are brought together here, in the Introduction, not so much with a view to their being read and committed to memory in a lump, like a lesson at school, as for convenience of illustration and future reference. The etymologies or particular derivations are given in the glossary, where the inexperienced in Latin and Greek will find everything made plain.

THE ROOT.

The Root is that strong, underground part of the plant which holds it firmly in its place, as anchors hold ships, and also sucks up water, and transmits it to the stem above. Generally speaking, it consists of two portions, one stout and thick, and more or less branched, called the "caudex;" and issuing from this, a vast quantity of slender fibres, resembling threads. In small plants the caudex varies from the size of a quill to that of a man's arm, and is dry and woody, or soft and juicy, like a turnip, according to the use it is designed for. Sometimes there is no proper caudex, and the root is fibrous throughout. The caudex of the roots of trees often grows to be nearly as large and massive as the boughs, but in either case the fibres or rootlets are slender and thread-like. The point of every fibre is soft and spongy. It is here alone that water is sucked up, and from this circumstance it is called the "spóngiole." The reason why flowers hang down

Fig. 1.

Fig. 2.

Fig. 3.

their leaves and often die, after being transplanted, especially in warm weather, is, that the spongioles get injured, and many of them broken off, during the process. When a good ball of earth is preserved about them, they sustain no hurt, and the plant will bear removal even on a hot summer's day. Some plants have portions underground which are *not* roots, as tulips, onions, snowdrops, lilies, and even potatoes. Take, for example, the onion. The white fibres hanging down underneath the round and solid part alone are roots. The onion itself is a kind of great underground bud, as shewn by its numerous leafy layers. Underground buds of this description are very common in certain families, and are well known by the name of "Bulbs" or "Bulbous roots." (Figs. 1 and 2.) Potatoes are different again. The Potatoe

plant, in addition to the stems which it elevates into the air, sends out many more below the surface, much after the manner of the runners of a strawberry, only that they do not extend beyond ten or twelve inches. After a while, these underground stems stop growing, but sap continues to flow into them from above, and accumulates at the extremity, where it gradually forms the potatoe; just as a stream of water, suddenly checked by a fallen bank of earth or other obstacle, accumulates behind the barrier, and forms a pond. The real roots of the potatoe are the brown fibres that hang down from it. (Fig. 3.) Many plants form lumpy underground masses of similar nature, though not exactly in the same way. Along with the potatoe, they are called "Tubers" or "Tuberous Roots." The *Iris*, the wood-anemone, and several others, have a thick underground horizontal stem, technically called a "rhizome." Another modification is seen in the crocus, which is round like the onion, but solid throughout, and called a "cormus." While stems are occasionally produced below the surface of the ground, roots are sometimes put forth from the aërial parts of the plant. Pretty and familiar examples of this occur in the delicate green *Lycopodiums*, now such favourites for green-houses and fern-cases.

THE STEM.

The Stem, with the exceptions named above, is the part which rises into the air, generally dividing into branches, and bearing the leaves, the flowers, and the fruit. Whether weak and diminutive, as in the violet, or an enormous woody pillar, as in the trunk of a tree, it is still called the stem, and the boughs, the branches, and the twigs included under the one general name. The chief points to notice in it are the shape, the direction, and the amount of branch. Usually it is round, but in small plants often four-cornered, or three-cornered, and sometimes deeply furrowed. In the everlasting-pea it is curiously winged; in other plants covered with hair, wool, down, thorns, or prickles, as in the rose and bramble. A few, such as the hemlock and dragon-plant, have it spotted and blotched with red or purple. At short intervals along the stem, there are knots or joints. These are called "nodes," and the lengths of stem lying between them, the "internodes." (Fig. 4, *a*, *b*.) The *direction* taken by the stem is very important to notice. Usually it is erect, sometimes remarkably so, as in the Italian poplar, but in small plants it often lies prostrate, or nearly so, and is then called "procumbent." When

a procumbent stem takes root at every joint, and sets up outposts, as in the strawberry, it is called "creeping." (Fig. 6.) The stems of the honeysuckle, the hop, the scarlet bean, and many others, being too weak to stand upright, and more ambitious than the procumbent kinds, lift themselves towards the sun by twining round and round their stronger neighbours, or whatever slender column may be nearest,

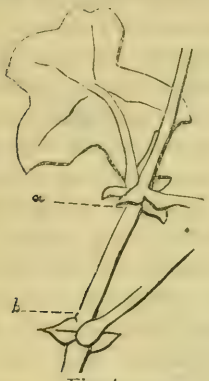


Fig. 4.

Fig. 5.

some kinds turning to the right, and others to the left. (Fig. 5.) The nasturtium, Virginian-creeper, ivy, fumitory, and many other weak-stemmed plants, ascend by curious methods which quite remind us of the contrivances of instinct. The variety in the degree of branching may be illustrated by the stems of grasses, and those of trees. The former kind have scarcely any branches, and, with all

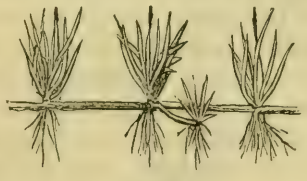


Fig. 6.

of similar nature, are called "simple;" while the latter, spreading freely in all directions, are termed "compound." If very straggling and irregular in its branches, the stem is called "diffuse;" and if repeatedly forked, like the mistletoe and the *Radiola*, "dichotomous." Partly on the duration of the stem, and partly on that of the root, depends the length of time a plant exists. There are three

principal descriptions of lease or term of life in plants. Those which live for only a few months, say from spring to autumn, and are then cut down by the frost, or die of exhaustion, are called Annuals; those which live, as regards their roots, for portions of two years, are called Biennials; and those which survive for a long series of years, their roots retaining vitality, whether the stems die down in the winter or not, are called Perennials. The turnip is a biennial; yellow lupines and sweet peas are only annuals. Plants that die down in the autumn, whether annual, biennial, or perennial, and all that are of a soft and succulent nature, whatever may be their stature, are called "herbaceous;" perennials with woody stems, many of the latter generally rising side by side from the root, are called "shrubs;" tall and woody perennials, with a single stem from the ground, are "trees." Most stems, it should be added, consist of wood, bark, and a thread of pith in the middle, like the marrow in a bone. But these three elements are not always distinguishable, and in one large class the distinction does not exist. They are best seen by cutting the branch of a tree across, so as to get a horizontal section of the respective parts. Pine and fir-trees shew the nature of bark very well, and young stems of elder the nature of pith. Grasses and plants of the Parsley-family often have hollow stems. Lastly, there is a large class of plants in which stems are never developed. These are called "stemless."

THE LEAVES.

No part of the plant, not even the flower, requires more careful consideration than the Leaf. The source of a great part of the beauty of the world, as we feel so powerfully when the verdure of Spring returns, there is scarcely anything in nature more diversified, or which presents forms of greater symmetry, or of more elegant simplicity. Usually the leaf consists of a flat and thin portion called the blade or "lamina," and a stalk called the "petiole." In this state it is termed "petioled" or "petiolate." (Fig. 8.) But it often happens that the petiole is not developed, and that the blade grows directly from the stem; it is then said to be "sessile," literally "sitting close," (Fig. 7.) and if so intensely sessile as to embrace the stem, "clasping," or "amplexicaulent." Such leaves often have projecting extremities at the base, called "auricles," or "little ears;" and there are cases where the projecting parts meet upon the opposite side of the stem, and grow together by their edges, making it appear as if

the stem passed through the middle of the lamina. These are called "perfoliate." (Fig. 9.) The leaves of thistles and some other plants

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

have their margins continued down the stalk, giving it a bordered appearance. In this case they are called "decurrent," literally "running down." (Fig. 10.)

The blade is of every imaginable shape, from the long, narrow ribbon of the grass up to the broad angular shield of the rhubarb. No figure can be drawn, round, oval, elliptical, square, three-sided, six-sided, seven-sided, or anything else, that has not already been used by inventive nature for the outline of a leaf. Many pages might be filled with descriptions of them, but it is unnecessary for general purposes that we should specify more than the principal types. The illustrative drawings are not intended to indicate sizes, not even relative sizes, but simply the shapes or outlines. Neither are they in any case theoretical, or artistically "touched up," but sketched directly from nature in all her waywardness. The following are the chief:—

"Needle-shaped," as in the fir-tree.

"Linear," very narrow, with the edges either parallel or tapering to the point, like a blade of grass. (Fig. 12.)

"Lanceolate," long and narrow, tapering towards each end. (Fig. 13.)

"Oval," twice as long as broad, and narrowing to each end.

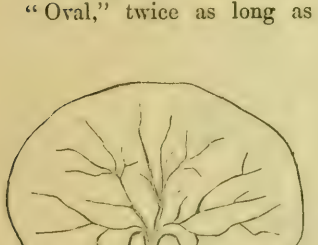


Fig. 11.

Fig. 12. Fig. 13.

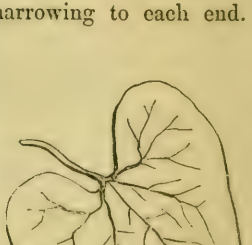


Fig. 14.

"Egg-shaped" or "ovate," in length and breadth like the former, but narrowing to only one end, like the section of an egg. When the base is the narrower end, it is called "inversely egg-shaped," or "obovate." (Fig. 17.)

"Round," when the length and breadth are about equal.

"Kidney-shaped." (Fig. 11.)

"Heart-shaped." (Fig. 14.)

"Triangular." (Fig. 16.)

"Hastate," arrow or spear head-shaped. (Fig. 15.)

The preceding are called "simple" leaves, because consisting of a single blade or lamina. There is another large class termed "compound" leaves, in which numerous small blades or "leaflets," each with a short stalk of its own, are combined into a symmetrical whole. Of these there are two principal forms, and several minor varieties, the important characteristic in every instance being the attachment of the component leaflets to the main stalk by means of a swollen and

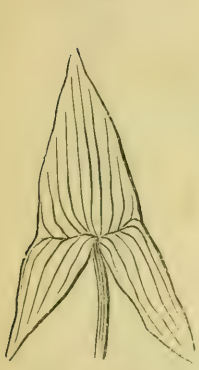


Fig. 15.

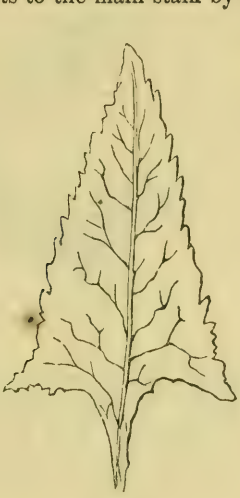


Fig. 16.

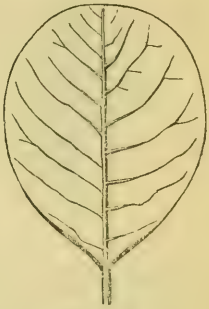


Fig. 17.

hinge-like joint, which enables them, in many cases, to move upwards and downwards, as in the sensitive-plant and the wood-sorrel. Compound leaves are scarcely ever sessile, but on the contrary, usually provided with long petioles. The lotus is the only example of the former among our wild-flowers.

The following are the chief varieties and their names :—

"Pinnate" or "feather-like," when several pairs of leaflets proceed laterally from a main stalk. There may be only two or three pairs, or thrice or four times as many, and with or without an odd one at the end. (Figs. 18 and 21.)

"Doubly-pinnate," when, instead of single leaflets, there are as it were smaller pinnate leaves.

"Binate," when there are only two leaflets. (Fig. 20.)

"Trifoliolate," when there are three leaflets. (Fig. 19.)

"Quinate" and "Septate," when there are five or seven leaflets, all from one point. (Fig. 23.)

"Digitate," when the leaflets are numerous, narrow like fingers, and all from one point. (Fig. 22.)

Fig. 18.

Fig. 19.

Fig. 20.

Fig. 21.

Intermediate between the simple and compound, there is yet a third class of leaves, having the appearance of the latter, but in reality only simple. The lamina is here deeply gashed, as if large pieces had been cut out with scissors, the "segments" or "lobes,"

Fig. 22.

as they are called, being more or less combined at the base, like the toes in the webbed foot of a water-bird, and of course without a hinge. They are spoken of as "divided" leaves. The varieties are exceedingly numerous, but the study of them is greatly facilitated by their

resolvableness into three principal kinds, two of which sportively imitate the pinnate and digitate among compound leaves. So close is

Fig. 23.

Fig. 24.

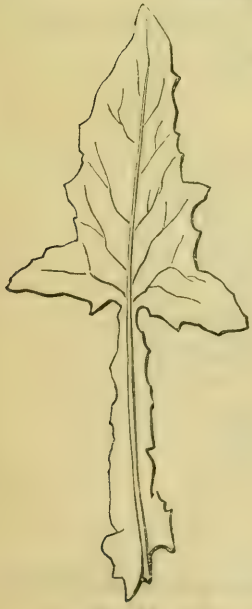


Fig. 25.

Fig. 26.

Fig. 27.

the resemblance of some divided leaves to the really pinnate and digitate, that it becomes necessary in practice to call them by the

same names. They are immediately distinguished by the want of the hinge-like joints. The following are the principal modifications:—

A. *Resembling pinnate leaves, and generally sessile.*

"Pinnatifid," when cut like a pinnate leaf. (Fig. 24.)

Fig. 28.

Fig. 29.

"Feather-lobed," when the segments are few, shallow, and directed upwards, as in the oak-leaf. (Fig. 26.)

"Lyrate" or "lyre-shaped." similar to the preceding, but with the terminal lobe very large. (Figs. 25 and 27.)

Fig. 30.

"Runcinate," when the segments are pointed, and directed towards the base of the leaf, as in the dandelion. (Fig. 31.)

"Pectinate" or "comb-like," a pinnatifid leaf, with very narrow, close, and parallel segments, resembling the teeth of a comb.

"Doubly-pinnatifid," when the lobes or segments are themselves cut and divided, as in the tansy leaf.

B. *Imitating the digitate leaf, and generally upon stalks.*

"Fan-lobed," when with five or more great clefts directed towards the leaf-stalk. (Fig. 32.)

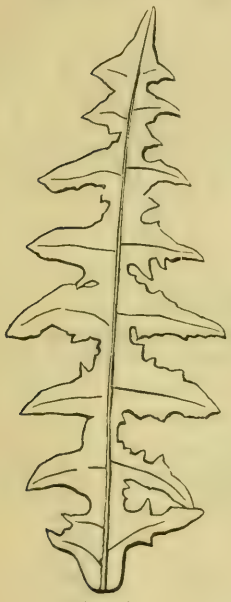


Fig. 31.

Fig. 32.

"Fan-lobed and cut," as in the purple monkshood. (Fig. 30.)

"Palmate," when the clefts extend nearly to the base of the leaf, as in the most kinds of passion-flower. (Fig. 29.)

"Ternate," when there are only three such clefts, as in the hepatica and the wood-anemone.

C. *Triangular in general outline.*

"Triply pinnatifid," a leaf with many branches, divided and subdivided, as in parsley, celery, hemlock, and most of their family. (Fig. 33.)

Next to the general figure and composition of the leaf, it is important to notice what kind of *edge* it possesses. The terms used

for the varieties here met with are applied both to simple leaves and to the leaflets of compound ones. Those enumerated below are all very common.

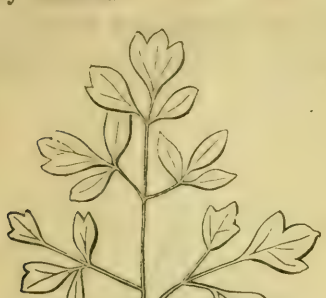


Fig. 33.

Fig. 34.

"Entire," when the edge is unbroken. (Fig. 36.)

"Serrated" or "toothed," when resembling the edge of a saw. (Fig. 35.)

Fig. 35.

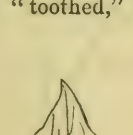


Fig. 36.

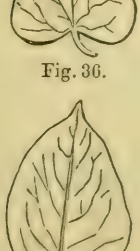


Fig. 37.

Fig. 38.

Fig. 39.

"Prickly," when the teeth extend into long sharp points, as in holly.

"Crenate," when the teeth are rounded, as in betony. (Fig. 38.)

"Ciliated," when set round with fine hairs resembling eye-lashes, beautifully exemplified in the newly-expanded foliage of the beech-tree.

"Waved," when the edge is in little concaves and ridges, as in drawings of sea-waves. (Fig. 34.)

After this we must observe the point, or extremity which lies remotest from the petiole; or if a sessile leaf, then remotest from the stem. It is called—

"Pointed," when as in Fig. 37.

"Acute," when the point is fine.

"Acuminate," when long drawn out. (Fig. 39.)

"Obtuse" or "blunt," when rounded off. (Fig. 17, p. 13.)

"Abrupt," when the end seems amputated.

The surface has likewise to be considered, the varieties being designated as follows:—

"Glabrous," when totally devoid of down or hairiness.

"Glossy," when not only glabrous, but polished and shining.

"Downy" or "pubescent," when covered with soft, short hairs.

"Hairy," when the hairs are few, and stand erect.

"Bristly," when the hairs are very stiff, as well as erect.

"Silky," when the hairs are long and white, and lie flat, as in silverweed.

"Rough," when like an elm leaf.

"Puckered," when like a primrose leaf.

"Glaucous," when of a bluish or gray-green colour, as in the carnation.

All these conditions incessantly recur, the different outlines, points, edges, surfaces, &c., being combined in hundreds of different ways, and constituting the finest and oldest heraldry in the world.

Looked at against the light, and often without recourse to this, leaves are seen to be traversed in all directions by delicate lines. These indicate sap tubes and threads of woody matter, and are called, though rather inappropriately, the "veins." The mode of their dispersion is exceedingly important to notice, being concurrent with peculiarities of structure in the stem, flowers, and other parts, and often a ready guide to the family a plant belongs to. There are six principal varieties:—

"Net-veined," when the veins branch and interlace in every direction, a very common occurrence. (Fig. 41.) The large, robust vein generally proceeding from the leaf-stalk to the upper extremity, and dividing the lamina into two nearly equal portions, is called the "midrib." (Figs. 31 and 40.)

Fig. 40

Fig. 41.

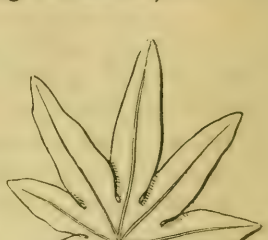


Fig. 42.

"Feather-veined," as in the hazle and Spanish chesnut. (Fig. 40.)

"Fan-veined," when like the ribs of a lady's fan, as in the sycamore and Fig. 42.

"Ribbed," when there are three or five great longitudinal ribs, as in rib-wort and the cinnamon-tree. (Fig. 43.)

"Parallel-veined," when numerous veins run side by side, without any interlacing, and converge gradually to the point, as in the lily of the valley. (Fig. 45.)

Fig. 43.

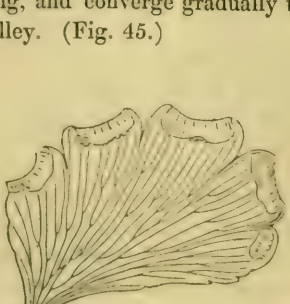


Fig. 44.

Fig. 45.

"Fork-veined," when like the letter V, with smaller v's proceeding from the points. (Fig. 44.) This occurs only in ferns and a Japanese tree called *Salisbúria.*

Held between the eye and the light, leaves sometimes appear pricked full of little holes, such as a needle would make. These are minute receptacles of oil, rendering the leaf transparent in those places. Leaves where they occur are said to be "dotted."

In many families of plants there are appendages to the leaves, the presence of which frequently helps much to the discrimination of them. Two principal kinds are observable, called respectively "stipules" and "tendrils."

Stipules resemble a pair of little wings, growing one upon each side of the petiole. Sometimes they are enormous in proportion to the leaf, as in the pansy and the culinary pea; and sometimes they are reduced to mere thorns, as in the *Robinia*. Fig. 49 shews their form in the rose-leaf.

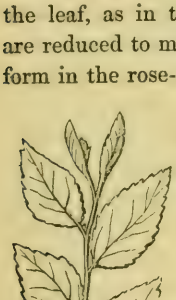


Fig. 46.

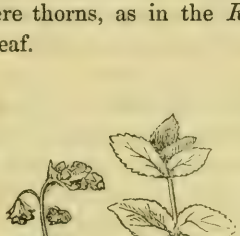


Fig. 47.

Fig. 48.

Fig. 49.

Tendrils are those beautiful little twining green fingers which we see upon such leaves as those of the pea, enabling it to grasp a friendly neighbouring prop, and ascend into the air. They are either simple or branched. Tendrils, however, are not always attached to leaves, being sometimes modifications of other organs.

Finally, there is the position of the leaves upon the stem, a circumstance always of great moment. We find them either growing in pairs, each leaf pointing in a contrary direction, when they are called "opposite;" (Fig. 47.) or singly, when they are "alternate;" (Fig. 46.) or in a ring, like the spokes of a wheel, when they are called "whorled" or "verticillate." (Fig. 48.) If alternate leaves are distributed irregularly over the stem, they are said to be "scattered;" and when opposite ones are very close together, and pressed close against the stem, so as

nearly to conceal it, they are said to be "imbricated." This last is very prettily shewn in young branches of the common heather; the others are plentifully exemplified in every field and every garden. The leaflets of compound leaves are also said to be opposite or alternate, according to their position upon the petiole. When the plant does not develop a stem, and the leaves spring immediately from the ground, they are called "radical," or "from the root," as well illustrated in the primrose.

The space between the stem and the petiole of the leaf, on the upper side of the latter, is called the "axil" or "arm-pit," from its resemblance to that part of the body reversed. It is from the axils that almost all buds, twigs, and flowers are sent forth; and to denote this, when important to be taken notice of, it is said that they are "axillary."

In regard to duration, leaves are called "evergreen" when they remain upon the plant or tree during the winter in a green and living condition; and "deciduous" when they fall at the close of autumn. All leaves drop and are renewed sooner or later, the evergreen ones merely enjoying a longer lease, and, like all things of nobler privilege, given as springs of refreshment and beauty when evanescent summer splendours shall have departed. How rich and cheering at midwinter the bright green of old England's indomitable holly, that sturdy and sacred bush which laughs at frost as complacently as the Christmas it decorates!

A few plants are absolutely leafless, as will be mentioned in the proper place; and there are others, as the furze and cactus, where they are contracted into prickles.

The use of the leaves is to convert the crude watery matter sucked up by the roots into proper vegetable substance. They have been compared, because of this, to the digestive organs of animals; and as their functions are respiratory in addition, or of the nature of breathing, they have been compared also to the lungs. To enable the breathing and digestion to proceed, the whole surface of the leaf, both on the upper surface and the under, or at least in all land-plants, is clothed with a delicate and transparent skin called the "cúticle." This "cuticle" abounds with little mouth-like openings called "stómates," which open and close, according to circumstances, and are very plainly seen with a microscope, if a piece be stripped off and put in a drop of water, with a bit of glass over to keep it flat, and

examined by transmitted light. The best kind of leaves to select for the purpose are those of succulent and fleshy plants.

Now as to the mode of their action. Chemical experiments have shewn that vegetable life is endued with the wonderful power of decomposing the carbonic acid of the atmosphere, and that this process is effected in the leaves, during the day-time, or when the sun shines. The oxygen is set free, and the carbon retained in the leaf, and applied, along with the water and other matters absorbed from the soil and air, to the manufacture of the wood, the pulp, the peculiar juices, and everything else that enters into the composition of the plant, each particular product being sent down, as fast as made, into the root, or the stem, or some other part of the general store-house underneath. In a word, after the plant has emerged, like an infant, from the seed, its enlargement is entirely owing to the leaves, which come out fresh and fresh every spring, work diligently all the summer, and having wrought their manifold and useful works, each in its own way, die as quietly and contentedly as they have lived, beautiful images of all true and noble souls, and in their decayed remains replenish the earth anew.

If leaves be not developed, the surface of the stem is provided with a cuticle which answers the same end, as in the cactus.

THE FLOWER.

The Flower is by no means the simple thing it appears at a distance. Ordinarily there are present in it no less than four distinct parts, two of which are composed of still finer ones. There are important varieties also in the general structure of flowers, rendering it necessary to separate them at the very outset into the three following classes :—

Complete and Simple.
Complete and Compound.
Incomplete.

We shall take them in the order named, confining our attention first of all to complete and simple flowers, such as the lily, the polyanthus, and the lilac.

The most striking and beautiful portion of such a flower is that wherein the colour usually lies. Botanists call it the "corólla" or "little crown," the flower being the consummate glory of the plant, that which makes and signalizes its day of greatest honour, like the

placing of the diadem on the brows of a king or queen. Generally speaking, the corolla is composed of many separate pieces, which can be picked off one by one. These are called the "pétals," and a flower is said to be three-petaled, four-petaled, five-petaled, &c., according to their number. When more than ten are present, the flower is called "polypétalous" or "many-petaled." In some families the petals grow together by their edges, and form a kind of cup or bell. The flower is then said to be "monopétalous" or "one-petaled,"—but only because of the *appearance*,—there is no such thing in nature as a really one-petaled flower; and save for the term being old and current, it would be better to discard it, as only tending to create mistakes, and supersede it with "sympetalous" or "joined-petaled." In the *Convólvulus* and many other flowers the lines of junction are plainly evident, resembling seams, and frequently of a darker colour than the intermediate parts of the corolla, ornamenting it with stripes. If the petals be united for only a portion of their length, as in a *Campánula*, the corolla is said to be "lobed" or "divided," the appearance being that of a cup with deep clefts in its margin. According to the number of petals composing such corollas, they are called four-lobed, five-lobed, &c. But we must be careful to remember that all such seamings of lobes or divisions come, in reality, of the imperfect adhesion of as many distinct petals as there are points and spaces between.

In shape, size, and position, the petals vary greatly, giving rise to the chief part of the wonderful diversity so much admired in flowers. The first distinction originated by their differences is that of "regular" corollas and "irregular" ones. Those are called "regular" which, like the tulip and the primrose, consist of a fixed number of petals (whether separate or united does not matter), uniform in size and figure, and arranged symmetrically round a central point, like the rays of a star. (Fig. 50.) "Irregular" corollas are the contrary of this, comprising the very numerous varieties where two or more of the petals are quite different from the others, both in figure and dimensions, as happens in the speedwell, the orchis, and the monkshood. (Fig. 51.) Outside and underneath the corolla there is a green vase, generally about a quarter as large, and consisting, like the corolla, either of several independent pieces, or of a definite number united by their edges. The component pieces are called the "sépals," and the total of them the "cályx." (Figs. 52, 53.) While the blossom is yet a bud, the calyx encloses and protects the petals; but with the

opening of the latter, it falls back, and sometimes drops off altogether. This is the case with the poppy, which has a large and beautiful calyx of two sepals, between which, when it begins to open, we may discern the rich scarlet inner vesture, but so delicately hung that the expansion of

Fig. 50.
Regular flower.

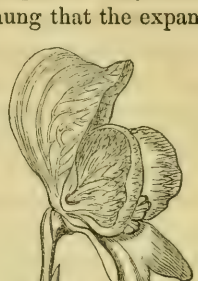


Fig. 51.
Irregular flower.

the latter is their instant destruction. Green for the most part, and usually inconspicuous, there are many cases where the calyx emulates the bright hues and splendid fashion of the corolla, and sometimes even

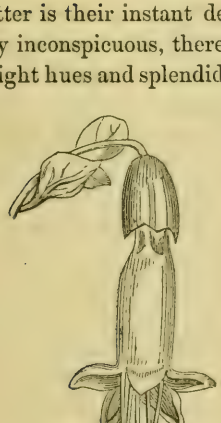


Fig. 52.
Calyx and corolla.

Fig. 53.
Back of Rose, shewing calyx.

eclipses them. The calyx of the fuchsia and of the scarlet-flowering currant are familiar examples. It often happens, too, where the petals are not developed. The calyx then takes their place, both in magnitude and shewiness, as in the anemone, the marsh-marigold,

and the Christmas-rose. With flowers, as with all her other gifts, Nature, if she closes one hand in denial, straightway opens the other in munificence. It is known to be the calyx by analogy, and also from the well-ascertained fact, that there is no such thing as a brilliant corolla *destitute* of protecting calyx. In other words, the outermost part of the flower, whatever its colour and texture, is invariably calyx, under some condition or other. In the Lily-family and its allies the calyx is almost always on a par with the corolla, both in development and lustre. Here it is known to be calyx by the *position* of the sepals, which parts, as a rule, stand in an outer ring, and alternately with the petals, covering their edges like a curtain behind half-opened folding-doors. It is very unusual to find the petals exactly *in front* of the sepals, though we have a ready example of it in the berbery. In the *Thunbérgia* and a few others the corolla is brilliant, but the calyx reduced to a mere ring, its protective office being here subserved by special organs called "bracts." A useful name for calyx and corolla, taken together, is "périanth." When both are present, it is common to say, "perianth double;" and when calyx alone is present, as often happens, "perianth single." In texture, it should be added, the calyx, with the exceptions named above, is usually leaf-like, whereas the petals are usually juicy, and with a surface resembling satin.

In the very centre of the flower stands the "pistil," generally of a green tint, and consisting of three parts, in relative form and position a pretty image of the three portions of a Corinthian column. (Fig. 56.) The lowest part resembles the pedestal, and is called the "óvary" or "gérmen;" the summit, resembling the capital, is called the "stigma;" and the intermediate stalk, resembling the shaft, is called the "style." In the ovary lie concealed the rudimentary seeds, or "óvules," as may plainly be seen in the blue-bell, the fruit being this very part enlarged into a state of ripeness. Sometimes the style is not developed, and then the stigma sits close upon the ovary; (Fig. 58.) and sometimes the stigma is nothing more than a fine point. There are many examples also of several styles to a single ovary, and of several stigmas to a single style. Moreover, there are many flowers, such as the buttercup, where the ovaries themselves are numerous, every one of them having its own style and stigma. Ordinarily the pistil is hidden by the petals, lying in the very heart of the flower, modest and guarded from view. But there are examples where the style is so much elongated as to bring the stigma forwards like a beautiful

pendent gem; and in one large class of plants the calyx and corolla adhere so closely to the exterior of the ovary, that they are lifted, in effect, on to its summit, as very prettily exemplified in the fuchsia. The ovary is usually divided into compartments, called "cells," and is spoken of as one-celled, two-celled, three-celled, &c., according to their number. Occasionally there is but one cell, as in the primrose. The rudimentary seeds lie within the cells, few or many in each, according to the fecundity of the plant.

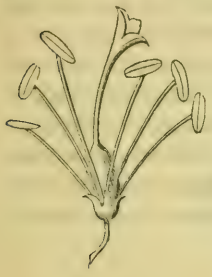


Fig. 54.
Stamens and pistil.

Fig. 55. Stamen.

Fig. 56. Pistil.

Fig. 57.
Opened corolla, shewing sessile stamens.

Fig. 58.
Stamens and sessile pistil.

Standing round the pistil are "stámens," (Figs. 54, 58.) slender little bodies, usually consisting of a thin stalk, and upon its summit a kind of bead, round, oblong, or kidney-shaped. The stalk is called the "filament," and the bead-like head the "anther." (Fig. 55.) The latter alone is indispensable, so that we need not be surprised at often finding it sessile and concealed in the cavity of the corolla. This occurs in the mezereon, where the eight little sedentary anthers are easily discoverable. (Fig. 57.) In lily-form flowers, such as the daffodil, the stamens are exceedingly well-shewn, being large and tall. They are conspicuous, too, in the fuchsia, the gentianélla, and the cactus, where they resemble a tassel of white silk. In the mullein, the Lancashire-asphodel, and the spider-wort, the filaments are ornamented with coloured hairs, and a similar decoration is occasionally found upon the anther. The latter organ is a box, usually of two compartments, and containing a light powder called "póllen." Most flowers have yellow pollen, but it varies to scarlet, blue, white, as in the convolvulus, and even black, as in the tulip. Every one who has watched bees at work, will remember how they creep out of the honied caverns of the flowers, all powdered and bespangled with golden dust. Examined with the microscope, there are few things in nature of more rare and astonishing beauty than the anthers and pollen.

The *position* of the stamens supplies characters of the highest importance. Sometimes they grow upon the distended summit of the flower-stalk, called the "receptacle," quite independent both of the ovary and the surrounding calyx and corolla, which can be removed without affecting them; (Fig. 59.) sometimes they are attached to the sepals or petals, springing as it were from the inner surface; (Fig. 60.) and sometimes they grow, along with the latter parts, upon the summit of the ovary. (Fig. 61.) In the first case they are technically called "hypógynous," in the second "perígynous," and in the last "epígynous." It is customary among the learned to say that a flower, with its stamens, &c., is "superior" when seated upon the summit of the ovary, (Fig. 61.) and "inferior" when enclosing it. (Figs. 59 and 60.) In the present volume these Latinisms are dispensed with. It is important, as regards perigynous stamens, to observe whether they are placed against the *centre* of the petals, or against the *edges*, that is to say, whether "opposite" the petals or "alternate" with them.

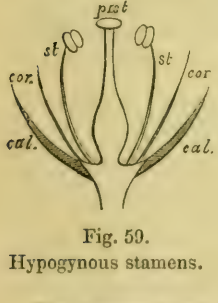


Fig. 59.
Hypogynous stamens.

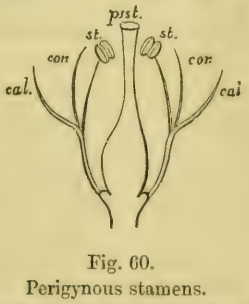


Fig. 60.
Perigynous stamens.

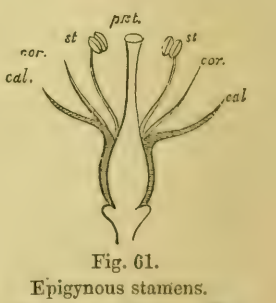


Fig. 61.
Epigynous stamens.

The stamens are not always independent of one another. The filaments often adhere at the lower part, like the palm and fingers of one's hand, and in the Mallow-family they combine so as to form a tube. The anthers are no less apt to grow together. The immense family of which the daisy is the type, has united anthers for one of its chief marks; and a similar thing occurs exceptionally in the gentianélla, the *Jasione*, and the pansy. Sometimes there is a fixed difference in the *length* of the stamens. The Sage-family has two long and two short ones; the Cabbage-family, four long and two short; and where there are ten or eight in a flower, one-half are very often twice as long as the remainder, as in the wood-sorrel and the *Clárkia*. The form and position of the stamens are best seen in flowers just about to open; and that of the pistils in flowers that are overblown.

Such, then, are the four grand constituent parts of simple and com-

plete flowers; the calyx outermost, generally green and inconspicuous; then the corolla, usually coloured and radiant; then the stamens; and, in the midst of all, the pistil. It rarely happens that anything is added: when an extra part is present, it is generally a special honey-cup or "nectary." Remarkably beautiful instances occur in the grass of Parnassus, already mentioned, and in the purple monkshood, where the nectaries resemble two little birds. The passion-flower is adorned with a splendid supplementary crown of rays, and the narcissus with an inner corolla, which encircles the stamens like a frill.

As soon as the flower has attained its full development, and shines in the sweet perfection of its beauty, the anthers open, and their pollen is conveyed over to the stigma. How this is effected, is not yet known, or at least very imperfectly. Insects have been supposed to aid the process, and no doubt they do in some slight degree; the wafting of the air may also give a little assistance; perhaps there is some kind of attractive power in the stigma, which draws the particles of pollen towards it as soon as they come within its sphere, as a magnet draws the atoms of steel-filings, only that in the flower it is vital force instead of physical. Generally speaking, it must be regarded as one of those interesting mysteries which are reserved for the pleasure of future ages. For nature takes her own time to reveal her secrets, not telling them all at once, nor to a single generation, even to the most diligently observant, but a few to one, a few to another, alluring us no less with her riddles than her smiles. Numberless contrivances are met with in different flowers calculated to facilitate the process, such as power to spring forwards on the part of the stamens, greater length of the pistil in pendulous flowers, and of the stamens in upright ones, both circumstances enabling gravitation to come into play,—and presenting, in their aggregate, some of the most captivating examples of the Divine adaptation of means to end anywhere to be found in nature. The passage being accomplished, after awhile a fine thread of semi-fluid matter exudes from the end of the pollen-grain, and pushes its way through the style into the ovary, where it enters an ovule, fertilizing it with power to ripen into a seed. The petals and stamens, along with the style and stigma, and usually the calyx, then wither more or less completely; the ovary alone remains, swelling fast, and gradually enlarging into the fruit. Every nut, and every berry, whatever its kind, was once the ovary of a flower, and every seed once a microscopic ovule. The calyx and corolla serve simply to guard and shelter the stamens and pistils. They play no

direct part in the preparation of the seed, as proved, negatively, by the circumstance of many flowers being devoid of them. The calyx and corolla are, in fact, but elegant apparel, with which nature, in her exquisite taste and delicacy, decks her favourites during the hours of their hymeneals, keeping it folded in reserve till the energies of stamen and pistil shall effervesce, and the poet's song of the loves of the plants become no fable. The corolla fulfils its office in the most beautiful manner. The petals are drawn together at the base, or combined into a cup; or, if unconnected, they close at night, and when it rains, so as to form a tent, in every case tenderly shielding the parts within; and when the sun glows warm and bright, turn towards it and spread wide open, that the life-giving flood shall pour in abundantly, and be reflected from their surface, as by mirrors.

Some plants have their stamens and pistils in *different* flowers, and even upon different individuals. The analogy of the animal kingdom gives to such the name of "unisexual," those where the two kinds of organs are associated in the same blossom being called "bisexual." Most of the unisexual have the two kinds of flowers differently formed. The hop bears its stamens in large, light, branching clusters, but its pistils in dense egg-like cones; while in the nut and the oak the former grow in pendulous catkins, and the pistils are enclosed in buds. The finest examples of unisexual flowers are supplied by the melon and cucumber family. Occasionally it happens that flowers belonging to families properly bisexual, are, through incomplete development, of only one sex, as in the common red lychnis of our hedge-banks.

The *numbers* of the several pieces of the calyx and corolla are very important to notice. Most flowers have their parts in *fives;* a second class is constructed upon the number *three*, and a third has the parts in even *fours;* every number varying at times into its multiples, as five into ten, three into six and nine, four into eight and two, and by halving this again, into *one*. The stamens often greatly exceed ten, as in the buttercup and the poppy; the pistils also are occasionally very numerous, again as in the buttercup, but in general they are the fewest parts of any, and in the majority of flowers there is but one, though it may in reality be compounded of several. It seldom happens that the petals exceed ten, except in "double flowers," which originate, under cultivation, and now and then in the wild state, in an immense extra-development of the corolla, accompanied by an almost total disappearance of the stamens. To learn the real nature of

double flowers, of course it is requisite to procure specimens that have undergone no change. Ordinarily every flower keeps to its own multiples, five or ten sepals implying five or ten petals, and five or ten petals implying five or ten stamens, &c.; but sometimes the numbers are a little intermingled, as three with five, and two with five. In such cases it is judged by the predominant number, or by analogy, to which of the three great classes the flower belongs, the corolla being consulted first, then the calyx, and lastly the stamens. With unisexual flowers, it is safest to take the male or stamen-bearing. These three great types of floral structure, as regards number, are called "pentámerous," "tetrámerous," and "trímerous," the first including such as are formed upon the number five, and its multiples; the second, those in which the number four, with its multiples, is predominant; and the last, such as illustrate the number three, and this whether the perianth be single or double, and the corolla regular or irregular. (Figs. 62, 63, 64.)

Fig. 62.
Pentamerous flower.

Fig. 63.
Tetramerous flower.

Fig. 64.
Trimerous flower.

Compound Flowers.

The preceding descriptions, as stated at the commencement, apply to "complete" and "simple" flowers. We will now consider the second great division, denominated "compound," and comprising such forms as the daisy, the aster, and the sun-flower. Their characters are strikingly distinct, and though occasionally found separately elsewhere, collectively they are peculiar to the family which includes the plants just mentioned, so that a description of compound flowers and a description of the Daisy-family amounts very nearly to the same

thing. Save for the exceptions, the consideration of them might have been left over to the page where that family is treated of.

The first grand characteristic of compound flowers is the cohesion of their five long and slender anthers, which grow together by the edges, and form a tubular ring, the upper half of the style being enclosed in it, and the stigmas alone exposed to view. The only example of such cohesion among simple flowers that from other circumstances might be mistaken for truly compound, is in the little plant mentioned before as the *Jasione*.

The second great character is, that the flowers, which are extremely minute, and called "florets" (just as the component pieces of a compound leaf take the name of "leaflets"), are collected into flat or conical cushions, surrounded by a leafy basket, which serves as a general calyx to the whole. The table-like surface on which they stand is termed the "receptacle;" and the basket, the "involucrum" or "anthodium." The latter part is occasionally brilliant in colour, and dry and chaff-like in texture, as happens in the flowers called everlastings. The florets might at the first glance be taken for stamens, so numerous are they, and so small. But they are perfect flowers in all respects. Every one of the yellow pips forming the centre of a daisy has its own calyx, five-lobed and tubular corolla, five stamens, and solitary pistil, and differs in no respect but that of size from a simple and regular flower of the largest development. In reality there are as many simple and regular flowers, every one of them with all the parts complete, packed together in that little disc, as, with care and patience, we might reckon yellow points. The florets are very seldom less than ten in number; there are usually many scores, and often several hundreds. When ripe, the multitude is made plain, every ovary becoming a large brownish seed-like fruit, crowned with a delicate feathery wing, which enables the wind to float it away over the country. Every one has noticed the large white tufted heads of the dandelion and the thistle, and how prettily their little balloons sail away when blown with the breath. The marginal florets very commonly have their corollas lengthened into long and narrow petals, which project a considerable distance beyond the edge of the basket, and give the flower the rayed appearance so conspicuous in the white edging of the daisy, and in the magnificent aureola of the sun-flower. Florets thus lengthened are called "ligulate." Sometimes the whole are ligulate, as in the hawkweed, and sometimes they are altogether of the cup or tubular form, when the blossom presents the

appearance seen in the thistle,—a purple or yellow and rayless mound. When both kinds are present, the central florets are called "florets of the disc," and the marginal ones "florets of the ray."

Fig. 65.
Tubular floret (magnified).

Fig. 66.
Compound Flower.

Fig. 67.
Ligulate floret (magnified).

It is by no means unusual to find simple flowers densely packed together into cushion-like heads, somewhat resembling the cornucopias of the truly compound, as in thrift, the scabious, and even in clover. The former are even surrounded by a basket, but their anthers are distinct, and stand widely apart; while in the clover the corolla is irregular, and the basket not developed.

Incomplete Flowers.

While complete flowers, both simple and compound, are provided with a perianth, either single or double, and are usually conspicuous and ornamental, "incomplete" flowers are destitute of this part, and often have their stamens and pistils entirely unprotected, as happens in the ash-tree. The arum would be in the same condition were it not for a peculiar organ called a "spathe," that serves as a hood or cowl. The flowers of unisexual plants, especially unisexual trees, are almost always incomplete, the stamens being covered only by a little scale or "bract." This is the case with fir-trees, the oak, the willow, the poplar, and the water star-weed. Grasses, instead of calyx and corolla, have the membraneous coverings exemplified in the chaff of wheat, which is no other than the withered and dried envelope of the stamens and pistil. A great distinction exists, however, between the flowers of grasses and all others that are incomplete, namely, in

the arrangement of the separate pieces of the flower upon the stalk. Everywhere else they are disposed in *whorls*, one ring concentrically within another; but in grasses the pieces stand singly and alternately, one *above* the other; close enough, nevertheless, to form a compact enclosure. (Fig. 69.) In every other respect incomplete flowers agree with complete ones; that is to say, they have stamens and pistils, which (with one or two exceptions) are formed in the same way, and the functions of which are similar, and fulfilled after the same manner. Some of the noblest productions of nature have incomplete flowers; the

Fig. 68.
Catkin.

Fig. 69.
Flower of Grass (magnified).

number of tall and stately plants with flowers so formed far exceeds, indeed, that of the inconspicuous, shewing that we are by no means to confuse the idea of an *incomplete flower* with that of an *imperfect plant*.

The Inflorescence.

With the nature of the flower is intimately connected the mode of its evolution from the stem; in other words, what kind of bunch or cluster it helps to form, or if solitary, how and whereabouts it is placed. This is often exceedingly important to notice. When the individual flowers on a stem or branch are without stalks, they are said, like leaves of the same character, to be "sessile." When provided with little stalks, the latter are called "peduncles," the peduncle being analogous to the petiole of the leaf; and if the peduncles have still smaller divisions, these last are termed "pedicels."

The distribution of the flowers upon the stem is called the "inflorescence," and is of two general kinds, "solitary" and "clustered," each having several varieties. Many modifications may be present in the same family, but no plant has more than one kind. The following comprise the most usual and important forms:—

A. Flower solitary.

"Solitary and terminal," when the stem or branch bears but one blossom, and terminates with it, as in the snowdrop and the tulip.

"Solitary and axillary," when the blossoms stand singly in the axils of the leaves, as in the pansy and the common crimson fuchsia. In both cases they may be numerous as regards the entire plant.

B. Flowers clustered.

The forms of inflorescence where the blossoms are clustered, bear special names, and are designated as follows:—

The "umbel," when many peduncles spring, side by side, from the summit of the general flower-stalk, and point in all directions, as in the onion and polyanthus. (Fig. 72.)

The "compound umbel," when the peduncles, instead of bearing flowers, support smaller umbels, called "umbellules." This kind of inflorescence is peculiar to the Parsley-family. (Fig. 71.)

The "corymb," when the peduncles, instead of proceeding all from the same point, as in the umbel, spring from many different points, and form such a cluster as that of the elder. The "cyme" and the "fascicle" (Fig. 70.) are of the same general character.

Fig. 70.
Fascicle.

Fig. 71.
Compound umbel.

Fig. 72.
Umbel.

The "head" resembles an umbel with the flowers all sessile, or nearly so, as in clover and thrift.

The "whorl," when flowers grow plentifully in the axils of opposite leaves, so as to form a seemingly unbroken ring round the stem, repeated on a smaller scale with every successive pair of leaves above. The yellow dead-nettle is a good example.

The "spike," when numerous sessile flowers are packed together in such a way as to form a long, slender, and cylindrical cluster, like that of lavender and wheat. (Fig. 74.) The spike is sometimes several feet long, as in the hollyhock and the mullein.

The "raceme," when the flowers are borne, as in the "spike," but provided with peduncles, as in the laburnum and red currant. The raceme is generally *pendulous*, and the spike generally *upright*. Racemes are occasionally a little branched, and in a few plants they are curiously curved inwards while young, like a fern-leaf, as happens in the forget-me-not, the heliotrope, and the sundew. They are then called "circinate," or "incurved." The stalk straightens as summer advances, and the curve disappears. (Fig. 75.)

The "catkin" is a kind of raceme peculiar to unisexual trees, composed simply of bracts and stamens or pistils. Alder and hazle trees furnish examples. (Fig. 68.)

Fig. 73.
Panicle.

Fig. 74.
Spike.

Fig. 75.
Incurved Raceme.

The "panicle" is like a raceme very much branched and subdivided, as in oats, lilac, and bunches of grapes. (Fig. 73.) Several different varieties have been distinguished, according to the particular figure and direction of the branches. When but slightly branched, the panicle is called "simple."

The spike, the raceme, and the panicle often have their flowers all turned one way, like the leaves of a parlour-geranium when drawn by

the light. They are then said to be "unilateral," or "secund." The fox-glove and the *Gladiolus* shew it plainly.

Bracts.

"Bracts" have been mentioned once or twice. They are small leaves intermediate between the foliage of the plant and the calyx, bearing much the same relation to the peduncle that the stipules bear to the petiole. Sometimes they are very large and conspicuous, and supply excellent discriminating marks both for species and families, as happens with the fools'-parsley. There are cases where they emulate the petals, and are the handsomest and most highly-coloured part of the floral organism, as in the *Hydrángea*, the clary, and the scarlet *Euphórbia*. Fig. 71 shews their most usual form and position.

THE FRUIT.

After the root, the stem, and the leaves have fulfilled their duties as stewards of the vegetable household, enlarging its fabric, and maintaining it in health and vigour,—after the flower has been put forth, and the stamens and pistils have executed their office, and the petals that were so bright and lovely have departed, and the glory seems at an end,—the grandest event of all has yet to happen, and that is the *ripening of the fruit*—the harvest-home of the spring and summer labours. The fruit or seed-pod is the final production of the plant. Everything that has preceded it has had more or less immediate reference to it, just as all the activities and aspirations of a man's social life have reference, though it may be unconsciously and undesignedly, to domestic happiness in wife and children. Well did the old poet call flowers and fruit the "joy of plants." Here, however, we are concerned with fruits as objects of practical Botany, and must leave what in other places would be a pleasant theme; reminding the student, in the first place, that the fruit is *the enlarged and perfected ovary;* and observing, that whatever the word "fruit" may signify in ordinary speech, botanically it means the seed-pod in its mature condition, whatever its substance, and whether fit to eat or not. The nature of the fruit, as to structure at least, of course depends upon that of the ovary. If the pistil be solitary, so will be the fruit; if there be many pistils, there will be many fruits; if the ovary be one-celled, in the ripe state it will be the same;—and so on with every other circumstance, though remarkable changes are sometimes

superinduced. The most extraordinary is the enormous accumulation of juice, and sugar, or acid, or starch, or oil, or whatever else forms the special characteristic of the fruit when perfected. The component cells of the fruit are called the "carpels," and the part to which the seeds are attached is named the "placénta." When the carpels stand apart from one another, they are said to be "free."

Three principal classes of fruits have been distinguished, named and characterised as follows:—

Simple fruits.—These come of a solitary pistil, the ovary of which consisted of a single cell, as in the pea.

Collective fruits.—These include such as originate in numerous pistils standing side by side, but free and independent. The Buttercup-family furnishes numerous fine examples.

Compound fruits.—These, the most numerous, originate in ovaries formed of many cells united together, as in the poppy and the apple, the "core" of which discloses the five carpels.

Each of the above classes contains many varieties, the total being about forty, and the following the most important:—

The capsule,—a dry box, containing seeds more or less loose and numerous, as in the poppy-head.

The berry,—exemplified in the grape and currant.

The apple-form, or "pome,"—as in the apple, pear, and quince.

The one-celled pod, or "legume,"—as in peas and beans.

The double pod, or "silique,"—as in the Cabbage-family.

The plum-like fruit, or "drupe,"—as in the plum, cherry, almond, and walnut.

The grain, or "achenium,"—resembling a little seed, as in wheat, and the strawberry, the juicy pyramid of which fruit is only the "receptacle." In the raspberry, the achenia are juicy, and the receptacle is the dry part; while in compound flowers they are often surmounted by a wing.

The nut,—as in acorns and filberts.

The cone,—produced by fir-trees.

The "hesperidium,"—as in the orange and lemon.

The "sorosis,"—as in the pine-apple.

The contents of the fruit are the Seeds, which on being sown in the ground, and exposed to the action of moisture, warmth, and air, germinate or grow, and produce new plants similar to the one that

ripened them. The outer skin of the seed, called the "testa," is often of some beautiful colour, as in French and scarlet beans, where it is variously mottled with white, purple, brown, violet, and other colours. The seeds of other plants of the Pea-family, brought from tropical countries, are remarkable for their brilliant orange-colour and scarlet, and the polished and shining surface. Seeds of many English wild-flowers are equally beautiful, though requiring the microscope for their peculiar character to be seen. Those of the Carnation-family, the poppy, and the henbane, appear as if carved and embossed with tubercles; and those of orchideous plants resemble purses made of fine net, each with a piece of money in the centre. On opening the seed, it is found to consist of white matter. This is generally resolvable into two distinct portions, as well shewn in an almond or a walnut, each being a "seed-leaf" or "cotyledon." They are connected at one end by a kind of hinge, which is the "embryo" or basis of the future plant. At the period of germination the embryo strikes a little rootlet into the ground, the testa being ruptured by the swelling of the whole mass, and often lifts the cotyledons into the air, where they become green, and are the sign that the seeds are "coming up." Sometimes they remain in the ground, and the embryo pushes up a "plumule," which is the beginning of the future stem, and soon commences to unfold little leaves. There are many seeds, however, where the cotyledons are extremely minute, and lodged in a quantity of floury matter, which nourishes the embryo when it germinates. The purpose of the cotyledons is likewise to supply nourishment while the plant is yet too weak and tender to procure food from external sources. Hence they have been compared to the breasts of nursing mothers, and it is not difficult to see how many and close are the points of resemblance. While fruits are often so small as to be mistaken for seeds, the latter, in their turn, are often so large as to resemble nuts and other fruits. This is the case with the seeds of the horse-chesnut, and with many that are brought as curiosities from tropical countries. There is an infallible distinction between a fruit and a seed, however much they may resemble;—the fruit always has a scar at the base, shewing where it was attached to the peduncle, and another upon the summit, indicating the former presence of the style or stigma; but the seed has never more than *one* scar, indicating the point at which it was connected with the placenta of the pod that contained it, and corresponding to that part of the body which anatomists and artists call the umbilicus.

We have now gone through the parts of which perfect plants are composed, and it remains but to recapitulate their names, and place them before the eye at one view:—

The Parts of a Perfect Plant.

The Root, consisting of caudex and rootlets, which end in spongioles.
The Stem, usually dividing into branches and twigs, and generally composed of wood, bark, and pith.
The Leaves, consisting of blade or lamina, and footstalk or petiole, and either simple, compound, or divided.
The Flower, consisting of
- Calyx, formed of sepals.
- Corolla, formed of petals.
- Stamens, formed of filament and anther, the latter containing pollen.
- Pistil, formed of
  - Ovary, containing ovules, or rudimentary seeds.
  - Style.
  - Stigma.

The Fruit, or ripened ovary, containing seeds.

IMPERFECT PLANTS.

"Imperfect Plants" are those in which the grand feature of the "perfect" division, namely, the blossom, is either absent, or developed in a manner so entirely different as to have gained for them the name of "flowerless." No plants are absolutely destitute of flowering or reproductive powers; nor, judging from philosophical analogy, of that wonderful two-fold principle which has its highest manifestation in male and female. But there are many in which it is extremely difficult to be determined, the apparatus found in perfect plants being represented very faintly even in the highest. Linnæus gave to the imperfect division of plants the appropriate name of *Cryptogámia*, or "hidden-flowered." While expedient to call them "flowerless" in practice, it is important therefore to remember that these plants are not destitute of reproductive parts, but simply that the latter are developed after another manner. Flowerless plants seldom develop stems; the greater part are low-growing and inconspicuous, consisting merely of leafy organs, and often of nothing more than crust-like, or spongy, or thready, or fibrous matter, and, at the lowest point, of no more than a few microscopic cells of coloured fluid. In our own

country, their noblest representatives are the ferns, those charming plants which grace every wood and shady bank with their light-green arching plumes, and are so curious in the brown spangles of their under surface. A particular account of the whole of the flowerless plants will come on by and by, under special heads; here it is sufficient to point to the fern, the common mushroom, and the black tangles left on the shore by the retiring tide, as supplying fair ideas of their diversified and extraordinary aspects.

CLASSIFICATION.

No department of Botany is more urgently important than Classification. The quantity of plants to be dealt with is so prodigious, that until in some measure classified, if but in theory, there is nothing but confusion and bewilderment. The pressing consciousness of the need of classification, in the early days of Botany, originated scores of different schemes intended to meet it; and so intimately is sound and philosophical Botany identified with a correct arrangement of plants according to their affinities, that nature's own plan, or the "Natural System," has been from the beginning, with every genuine botanist, the paramount object of research. Tournefort, a famous Frenchman, constructed an ingenious system dependent on the shape of the flower; other botanists tried to make the leaves and the fruits serve the purpose they had in view; Linnæus, who first gave solidity and coherence to botanical knowledge, skilfully took the stamens and pistils, and contrived a method which, though purely artificial, has made his name illustrious for ever, so successful was it in removing the difficulties of the age, and giving that precision and facility to botanical investigations, to which the present high position of the science of Botany is mainly owing. In the present volume we proceed upon the *Natural System*, or that which arranges plants into their families, seeing that it is now sufficiently matured to answer every purpose, and is much more solidly useful and instructive than the Linnæan, both at the beginning and continuously, since the former only takes us to a certain point, and has then no more to offer.

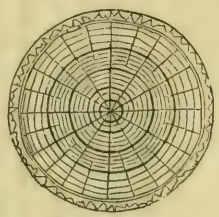
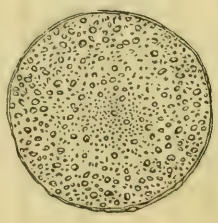
Classification by the Natural System begins with the separation of plants into the grand divisions described above, and called "Perfect" and "Imperfect." Each of these great divisions is then resolved into two classes, called "primary," and each of the classes into sections, from which we move forwards in turn to the families. The family,

after the same manner, is distributed into "genera," and every "genus" into a less or greater number of "species," which are made up of thousands and millions of "individuals." It is much the same as in geography, where we first have continents, then countries, then provinces, then parishes, then towns, streets, houses, and inhabitants.

On a very slight acquaintance with flowering plants, it is discovered that some possess *net*-veined leaves, and the remainder straight or *parallel*-veined; further, that when the leaves are net-veined, the parts of the flower are in *fives* or *fours*, and when parallel-veined, in *threes*. Further again, that the stems of the net-leaved plants are composed of distinct bark, wood, and pith; while in the parallel-veined there is no such distinction, the woody portion being commingled with the pithy, and bark entirely wanting: and lastly, that the seeds of the net-leaved plants contain *two* embryo leaves, which, at the period of germination, usually lift themselves above the ground, and spread horizontally; while those of the parallel-veined contain but *one* leaf, which, at germination, shoots up vertically, like a blade of sprouting corn. However trifling the two sets of characters may appear when stated in words, they are exponents of a thorough difference in every particular, both of structure and aspect. The two classes which they mark are called respectively EXOGENS and ENDOGENS, the names referring proximately to the mode in which the stem increases in substance and solidity, every plant that bears a flower belonging to one or the other, and plainly declaring which.* True, there are in both classes departures from the typical structure, and individuals, and sometimes entire families, curiously mimic the shapes of the other; but on the whole, the peculiar characters are constant and prominent, or at least sufficiently plain for practical purposes. One part or another is always in the front. If the leaves fail to shew whether the plant be an Exogen or an Endogen, it is told by the flower; and if the flowers refuse to speak, it is told by the stem or seed. With the aid of the diagram opposite, the two classes will readily be conceived.

* By some botanists they are called "Dicotyledones" and "Monocotyledones."

STRUCTURAL DIFFERENCES OF EXOGENS AND ENDOGENS.

	Section of Stem.	Veins of Leaves.	Numerical idea of Flower.		Seed-leaves.
EXOGENS...					
ENDOGENS					

Exogens.

Exogens comprehend by far the larger portion of flowering plants, though several of the most important and extensive families belong to the ranks of the Endogens. Every diversity of configuration occurs among them, and every variety of size, from the groundsel up to the oak-tree. There are scattered up and down their various tribes, rootless plants, stemless plants, leafless plants, and in not a few there are neither calyx nor corolla. The whole are susceptible, nevertheless, of distribution into

Plants with bisexual flowers,
and
Plants with unisexual flowers.

Bisexual Exogens.—While most flowering plants are Exogens, most of the latter are bisexual. How to separate these becomes the next consideration, and a seriously important one, since the families are very numerous; while in regard to the grand preliminary groups which undoubtedly they are referable to, Nature has refused to disclose her plan with perspicuity. The beginning and the ending are made plain, but the space lying between is half-hidden. One school of botanists resolves them into such as possess both calyx and corolla, or "Dichlamydeæ," and such as have calyx only, or "Monochlamydeæ," throwing the former into three sub-divisions, characterised by the insertion of the stamens, whether on the receptacle, on the sepals, or on the petals. The arrangement is meritorious, without doubt. It appears, however, neither so natural nor so eligible as that which, disregarding the uncertain distinction of presence or absence of corolla, disposes the whole of the families simply and at once under the three following heads:—

Flower *enclosing* the ovary, both calyx and corolla being removable without touching it; the stamens growing upon the receptacle, and thus as free and independent as the ovary.

Flower and ovary as in the first section, but the stamens attached either to the calyx or corolla.

Flower (including calyx, petals, and stamens) growing upon the *summit* of the ovary. Not that it is absolutely generated there, but the lower portion intimately adherent to the sides of the ovary, as explained on page 28.*

* No special names have been given to these three groups; they are simply called Hypógynous Exogens, Perigynous Exogens, and Epigynous Exogens.

This latter scheme recommends itself by bringing together a much larger number of related families than are found in proximity under the other; it prepares the way likewise for their being marshalled into sets of half-a-dozen or so, that can be pleasantly taken in at a bird's-eye view, an advantage which in the former case appears, to say the least of it, very partial. There is this great advantage, too, about it, that there are scarcely any exceptions to the grand distinctive characters, whereas in the other scheme they are innumerable. Whichever scheme be used in a book, the great primary classes of Exogens and Endogens are unaffected by it, and the families remain the same.

Unisexual Exogens.—These comprise only about a dozen families of importance, and therefore need no preliminary grouping.

Endogens.

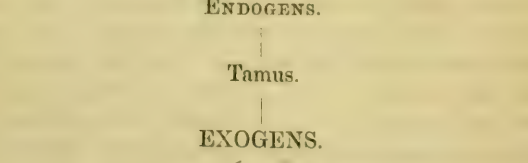
Endogens include all plants of a grassy kind, together with sedges, rushes, and the elegant tribes represented in the hyacinth, the orchis, and the lily. In hot countries their circle is widened by the glorious palm-trees, well called by Linnæus, the "Princes of the Vegetable Kingdom," and which, with a few exceptions, also tropical, are the only arborescent members of the class. Except in green-houses, we never see endogenous trees in England; and even the captives in our conservatories, with all their green and beautiful aspiration, give but a faint idea of the dignity of Endogens as they are in the Indies. The first section of Endogens has complete and usually brilliant flowers; those of the other are incomplete and chaff-like. They are called respectively "Petaloid Endogens" and "Glumaceous Endogens."

Flowerless or imperfect plants present themselves, like the nobler half of botanical nature, under two principal aspects. The species are innumerable; they belong, however, to very few distinct families. The higher forms comprise ferns, mosses, the delicate plants called *Lycopódium* and *Selaginélla*, and the curious "horsetails" or *Equiséta*, and from the circumstance of their possessing leafy organs, and more or less of an upright and green stem or stalk, with veins and woody fibres in it, are distinguished, technically, as Cormogens. The lower forms comprise sea-weeds, lichens, fungi, or mushrooms and toad-stools of all kinds, also the hair-like *Confervæ* of fresh-water, and

some other singular productions. As a whole, they are rarely green, and never produce stem or leaves, consisting of little more than masses of cellular matter, though the figures are often singularly beautiful and symmetrical. An entirely new world is opened among them by the microscope, which reveals shapes and phenomena of inexpressible wonder. They are collectively called THALLOGENS.

But while separated so decidedly in type or central plan, these four great classes, Exogens, Endogens, Cormogens, and Thallogens, are not exact and rigid in their *boundaries*. There are many curious plants which stand intermediately between them, giving a hand to each, and thus linking the whole into one grand confraternity. The *Tāmus*, or white bryony, which festoons the autumn hedges with vegetable coral, unites the Exogens to the Endogens; fir-trees touch both Exogens and Cormogens; and midway between the Exogens and the Thallogens stands an extraordinary Bornean plant, having the substance and general habit of a mushroom, but the configuration of a pentamerous flower. Intermediates of similar nature connect every subordinate class and family, locking all together in reciprocal affinity.

These things plainly shew how futile must be attempts to put the objects of the vegetable kingdom in a row, beginning with the noblest, and ending with the humblest. And yet this has been the aim and cherished fancy of many men who, captivated by the ancient and sonorous suggestion of a universal "chain of nature," have thought labour alone was necessary to arrange everything in exact sequence. There is no such line in nature. It is easy to pick out plants that can be placed in lineal order, but thrice as many must be omitted as incompatible. The true relation which the four great primary classes bear to one another is represented in the following diagram, wherein are introduced also the names of the principal intermediates:—



Exogens, as containing the most highly developed plants, occupy the middle position, and at equal distances stand the Endogens, Cormogens, and Thallogens, with their respective intermediates between. Everything stands pretty near to its related forms; and if we think of the noblest Exogen as the heart of a solid sphere, over the surface of which are diffused the lowest kinds of Endogens and of imperfect plants, the successively nobler lying intermediately and filling up the space, we shall understand how things stand related in actual fact, and how every plant has alliances on all sides. That this is the correct and philosophical view of the matter, is shewn at length in the author's work named below, wherein also are copious illustrations from the analogies of the Animal Kingdom.*

But on paper we must needs proceed in a straight line, taking things in the most natural succession that the exigencies of the pen will permit. In the present volume accordingly the families will be described in the order they have been mentioned, and of which the following table is a summary:—

PERFECT, or FLOWERING PLANTS.

Class 1. Exogens.

Section 1. *Bisexual Exogens.*

Group 1. Ovary free and enclosed; stamens on the receptacle. (Fig. 58.)

Group 2. Ovary free and enclosed; stamens on the perianth. (Fig. 59.)

Group 3. Perianth on the summit of the ovary. (Fig. 50.)

Section 2. *Unisexual Exogens.*

Class 2. Endogens.

Section 1. *Petaloid.*

Section 2. *Glumaceous.*

The Fir-tree family, intermediate between Exogens and Cormogens.

The Tamus family, intermediate between Exogens and Endogens.

IMPERFECT, or FLOWERLESS PLANTS.

Class 3. Cormogens.

Class 4. Thallogens.

* "Life; its Nature, Varieties, and Phenomena." Chap. xxix., p. 342. (Ed. 2.)

THE FAMILIES OF PLANTS.

A family of plants comprehends all those in a given class and section which are intimately alike in their general structure, and usually have a striking outward likeness in addition. The members are referable, for the most part, to some well-marked vegetable type, and seem to cluster, as to their characters, round a particular species which concentrates the natures of all. This central or concentrative species is used as the *name* for the family. The "Buttercup-family" is that of which the buttercup is representative; the "Cabbage-family" that of which the garden cabbage is the type, and so with all the others. The exact boundaries of the several families are sometimes a little uncertain, because on the confines they are prone to mingle, like the natives of contiguous countries. For the true idea of them we must look, accordingly, to the *centre*, determining them not so much by what they strictly *ex*clude, as by what they obviously and unmistakeably *in*clude. But it must not be thought that all the members of a family resemble the typical species in colour, bulk, and stature. Trees and herbaceous plants, land-plants and aquatics, may all be comprised in the same family; differences of size, colour, and place of growth being accidents compatible with completest resemblance as to essentials. The concurrence as to general properties among the members of a family was mentioned some pages back. There is an agreement also in the very nature of the sap. Trees of the same family graft readily with one another, but those of *different* families are indisposed to unite, even if they do not absolutely refuse, shewing at once which of a large company are aliens, and which have real affinity. The plants of the Ash-tree-family and those of the Jessamine-family were once thought nearly related; but although the former are somewhat heterogeneous, they graft readily on each other's branches, while the latter, which they resemble superficially, refuse to combine with them.

The families of plants vary greatly in extent. Some contain but half-a-dozen species; others many thousands; their own numbers, so far as ascertained, being about 300. They are seldom confined to a single country, but spread all over the world, though more plentifully in some latitudes than others, according as they are fond of heat or cold. The chief part belong to the tropics, but some are almost entirely extra-tropical. It is curious to see how families eminently belonging to warm countries, such as the mallow-tribe, creep, in a few

species, into cold ones, like beams of light stretching faintly into distant darkness, as if they would invite us to visit the realms of their magnificence.

GENERA AND SPECIES.

"Genera" bear the same relation to families that the families do to the great primary classes. Walk round a large garden, and you will see many kinds of lupine, and many kinds of larkspur. Each of these little companies is a "genus," and each of its constituent kinds is a "species." The "genera" are distinguished by peculiarities in the flower and fruit, while the "species" depend on differences in the form of the leaves and inflorescence, and in the general habit and configuration of the plant. In some families the genera are exceedingly difficult of discrimination. They are almost always a source of perplexity, since we have usually to wait for the ripe fruit before we can determine them, by which time the flowers are gone, and the foliage is often faded. Endeavour is made, in the present volume, to obviate this hindering difficulty, by means of a key to the families and species, independent of the generic characters, leaving the latter to be studied subsequently from other works. The name will always shew what genus a plant belongs to, and all that is practically wanted to ascertain it appears either as family character or specific character. When once a species is well known, all the others of the genus including it are for the most part easily identified as such, even when seen for the first time, by the similarity of their habit and contour. The external likeness is almost always a readier guide than the strict technical or scientific character.

Species are generally plain enough; every one knows a moss-rose from a monthly-rose, and both from the common dog-rose of the hedges, the single genus "Rose" including all three, along with many more. Most, however, of the fancy roses grown on lawns and in parterres are only "varieties," that is to say, casual deviations from the wild specific type, induced by cultivation, and by accidents of soil and situation. Dahlias, in like manner, are only "varieties;" and the same is the case with pansies, hyacinths, and the majority of "florist's flowers." Brambles and ferns exhibit a similar aptitude to sport into "varieties," even while growing in their native habitats. The difference between a mere "variety" and the original form is that the former can rarely be depended on as permanent when the circumstances that originated it cease to operate, and that it seldom repeats

itself through its seeds, but relapses into the original form, or changes to another variety, whereas the characters on which the "species" is founded never vary; the dahlia is still a dahlia, whatever its hue, and whether it be a "globe" or a "quilled." No rule can be laid down for discriminating at all times between a species and a mere variety, since to do so is possible only to experience; and not always then, for the definition of a "species" is not yet determined, and varieties are continually detected walking through the fences set up by rule and line systematists. The principal varieties occurring among our wild plants are those of *colour of flower*, many that are ordinarily red or blue being sometimes white, and the white ones occasionally blushing. The next largest class comprehends the varieties induced by growth in water. The leaves of plants which on the edges of a pond or stream are broad and flat, often, when wholly submerged, and especially if subjected to a current, lengthen into long, green hair-like fibres that remind us of some sea-weeds.

THE NAMES OF PLANTS.

In conclusion, we may say a few words on the *names* of plants, which are both "popular" and Latin, or "botanical." The popular name is that by which a plant is commonly called in the country or district where it grows wild; it differs, as a matter of course, in different places, the daisy, for instance, being called "gowans" in Scotland, and "marguerite" in France; and here we see at once why a uniform system of Latin names becomes absolutely necessary. Without them, botanists at a distance could not possibly understand one another. The Latin names have in no case been given out of pedantry, but to facilitate the communications of those interested in the objects that bear them. Nothing can be simpler than the principle on which they are constructed, the plan of the Latin being precisely the same as that of the English. Certainly, in some instances the English names are single, as primrose, cowslip, and daffodil; but the majority are twofold, as sweet-pea, field-pea, everlasting-pea. "Pea" is here the "generic" name, and the adjectives are the "specific" names, and in either case exactly illustrate the nature of the Latin names, which are also "generic" and "specific." For instance, LATHYRUS *latifolius*, or the "broad-leaved pea;" LATHYRUS *odoratus*, or the "sweet-scented pea;" LATHYRUS *azureus*, or the "blue-flowered pea." The Latin names, like the English, always *mean* something, and are

frequently descriptive of something curious in the structure of the plant. Very many generic names, however, are commemorative, or given in honour of eminent botanists, whose example is thus pleasantly held up before the mind when the plant happens to come in view. Such are *Linnæa*, *Banksia*, *Caleya*. The specific names are usually adjectives, and materially assist us in remembering and identifying the plant. In the following pages the English name is given first, and the Latin one afterwards, the latter being everywhere printed in italics, and accented. When Latin names end with a single *e*, this must be sounded, and *ch* is always to be pronounced as in Christopher, except in the commemorative, which follow the national pronunciation. Every one should learn the Latin names, if he would be intelligible to his brother-botanists, even on opposite sides of the town, so greatly do the popular or local names vary. The aim in the present volume has been to select out of the latter the most elegant and appropriate, and to discard, as far as possible, names conferred from mistaken notions, since they tend only to perplex and engender error. Unhappily, English nomenclature is crowded with such names, again shewing the desirableness of familiarity with the Latin ones. It is proper to add, that the Latin names, as well as the English, vary considerably in different authors, owing to circumstances which cannot well be explained here. Those have been adopted in the following pages which are best known and most commonly used, the duplicate names or "synonymes" being added whenever necessary.

PARTICULAR DESIGN OF THE PRESENT WORK.

When a fair knowledge of the structure of plants has been acquired, and of the principles of classification, there are various branches of Botany to which the intelligent mind may address itself with the highest advantage. For instance, *Vegetable Physiology*, or the science of the life of plants; *Botanical Geography*, or the history of the distribution of plants upon the surface of the earth; *Economical Botany*, or the consideration of the uses of plants as food, and as sources of timber, dyes, clothing materials, &c.; *Medical Botany*, or the investigation of their services as remedial agents in sickness. With the limited space at command it is impossible to do more at present than touch in the very briefest manner upon any of them, all being so comprehensive as to call for special treatises. What we aim at now is to introduce the lover of plants, by the easiest and pleasantest path, to an intimate knowledge of everything growing wild in the fields and woods, in the streams and on the hills, for seventeen or eighteen miles round the good city of Manchester, and to give along with this such particulars respecting the flowers and trees cultivated in gardens, shrubberies, and green-houses, as are tolerably frequent, and likely to attract attention. The "Flora" of a district, in the strict sense of the term, denotes merely the *wild* plants, and up to the present time, the books called "Floras" profess to include no others. But to an admirer of nature, a flower is a flower. Those who love plants are seldom found asking whether a given flower be indigenous or exotic; they wish to know what they have got, and care little for its birth-place. Besides, in a district that has been plentifully inhabited and diligently cultivated for centuries, there are numbers of plants and trees in a semi-wild condition, which the young botanist cannot possibly distinguish from the aboriginal. To be useful under all circumstances, a "Flora" should include both the introduced and the wild species, so long as care is taken to say which they are. This is done in the present volume. Every wild-flower is described at sufficient length for

its name to be ascertained; the places where it grows are described, and if it be rare, the exact localities are specified; every introduced plant is described in the same manner, and a clue furnished to the purely garden species. The latter consists in descriptions of every family of plants which has representatives near Manchester, whether wild or cultivated, together with a preliminary key to the families, such as will enable them to be discovered in a few minutes. Under every family comprising more than two or three species, there is given a table, or analytical chart of its members, partly "artificial" and partly "natural," placing the whole before the eye at one view. These family charts form, along with the key, which is constructed on the same principle, the great and novel feature of the volume. Every expedient is made use of in them that will take the student promptly to what he wants; but his attention is still called to the inmost and highest principles of Botany, which are never to be forgotten or subordinated. The privilege of a teacher is no more to make his subject intelligible and attractive, than to remember that all truth is of royal blood, and its dignity never to be sacrificed or ignored. Few are the plants in Manchester gardens that belong to families not included in the key; few, indeed, are the wild ones anywhere in England, so that although constructed specially with reference to the Manchester Flora, its utility is by no means local. Nor is it to the families only that it will prove a ready guide. All wild species of anomalous structure are introduced, and many also of the cultivated. "Varieties," except in special cases, are omitted, as they are comprised in the character of the species. That the descriptions of the families should be *complete*, enumerating all the minutiæ of their structure and exceptions, is not requisite in a work of this nature. Sufficient particulars are given for the determination of Manchester plants, and those who want what would have overloaded and encumbered the book, can easily get it from a Cyclopædia. Both the key and the charts start from the structure of the Flower. Trees, however, affecting us chiefly in the summer and autumn, when their flowers are gone, a second key is given for these, resting upon the peculiarities of their Leaves.

Still further to facilitate the young botanist's pursuits, references are made to three fine works in our Free Libraries, which contain coloured drawings of English wild-flowers, viz., Curtis's *Flora Londinensis*, in four volumes, folio; Sowerby's *English Botany*, in thirty-nine volumes, 8vo, including three of Supplement; and Baxter's

British Flowering Plants, in six volumes, 8vo. The Free Library at Camp-field contains all three, and there is a copy of Curtis also at the Chetham Library, bound in six volumes. Our pages thus become a little "Art-Treasures Exhibition Catalogue," so far as concerns Botany and the beauties of nature, "Curtis" and "Sowerby" taking the place of "Saloon A" and "Saloon B;" and art-treasures the pictures really are, especially those in Curtis, which should always be consulted first, on account of the full-length portraits. These works contain a variety of information respecting the plants they picture, and what more may be desired, can be gleaned from the "English Flora" of Sir J. E. Smith, the "British Flora" of Sir W. J. Hooker, and the famous old "Arrangement of British Plants" by Withering, the last-named a complete history of their domestic and medicinal uses. Everything about trees may be read in Loudon's "Arboretum Britannicum," at Camp-field.

As regards the Species included in the work, though persuaded that many are not genuine, I have thought it best not to omit them, but to insert and say what they are. Those which are no longer found growing in our neighbourhood, nor likely to reappear, are mentioned as historic only, and doubtful ones and garden runagates in parenthesis. The disappearance of a plant from a given station does not imply that it is absolutely lost, except under special circumstances. Seeds often lie dormant in the ground, and the plant comes up again after a time, as frightened animals feign death to escape the hunter, and when the danger is past, jump up and run away. Doubtless several plants are now entirely lost to the neighbourhood, but their places have been supplied by others. FLORA is always on the alert to repair injuries, and if building, cultivation, and the selfish rapacity of collectors, take away some, others are supplied in a few years. There are at least a dozen plants now growing wild near Manchester that thirty years ago were strangers. Everything is put down that is known to occur within eighteen miles, and any species or locality I am not well assured of, either personally, or by some intimate companion, is assigned to its authority, the names, when not inserted at length, being abbreviated as follows:—

James Percival, jun. (Prestwich)	J. P.
Richard Hampson (Little Hulton)	R. H.
John Shaw (Eccles)	J. S.
Joseph Evans (Boothstown)	J. E.
Buxton's "Guide"	B. G.

Blackpool, Southshore, Southport, and other places on the coast of Lancashire, are now brought so close to Manchester by the railways, and so many of our young people enjoy their summer holidays there, that I have thought it useful to append a list of the sea-side plants commonly found in their respective neighbourhoods. The families of these plants may be discovered by the general key.

INSTRUCTIONS HOW TO USE THIS BOOK.

Read the Introduction with care and attention, so as to obtain a general idea of the structure of plants, and of the meaning and nature of "families."

On gathering a plant in the fields or a garden, examine, and if necessary, dissect the flower carefully, referring at the same time to the key, and comparing every successive observation with the descriptions at the beginning of the several divisions of it. By this means the family will certainly be found, and probably the very species, the figures telling the page where it is spoken of particularly.

If it be the family that is found, turn to the page referred to, and see if the plant agrees with the general account of it; then trace it out by means of the chart beneath, or opposite, which, if it be a wild plant, will guide speedily to the name.

If it be a foreign plant, it will not appear in the chart, but will probably be mentioned in the subsequent remarks.

Having ascertained the English name by the chart, notice the number attached to it, and that will shew the way to the place in the list of "Habitats and Localities" with the Latin name and other interesting particulars. (The "habitat" of a plant signifies the *kind* of place in which it grows, as in woods, or fields, or ponds, &c.; the "locality" the *exact spot*, or as nearly as can be described in a few words.)

If perplexed by one blossom, dissect another, and if they all seem to differ, take the average; the truth cannot be altogether concealed. Besides, it may be that the first was not examined with care. Botany is not a study for the uncareful, but for the attentive, and if it seem

hard to learn, the blame is most likely *not* with the plant. Do not be too impatient, wishing to jump in at a dash, but proceed deliberately, step by step, taking care to understand, as you go on, what has been done, and what there is still to do. Lastly, when in the fields, and the locality of a rare plant has been found by means of this book, do not root it up. The true botanist loves to see plants living and growing, and it is only the mean and selfish who would pluck up a rarity, perhaps the only and last blossom, merely to make a mummy of it and call it a "specimen."

ARTIFICIAL KEY TO THE FAMILIES OF PLANTS,

AND TO THE REMARKABLE AND EXCEPTIONAL SPECIES DESCRIBED IN THIS VOLUME.

PRELIMINARY CLASSIFICATION.

I.—*Perfect or Flowering Plants.*

A.—Flowers Complete, and truly or apparently COMPOUND, consisting of numerous smaller flowers standing side by side in a basket or "anthodium," and with the anthers united (except in *Petasites*).

Ovary one-seeded (true compound flowers)—*The Daisy family*, p. 290.

Ovary many-seeded; flowers blue—*Jasione*, p. 287.

B.—Flowers Complete and SIMPLE. If many together in a basket, the anthers *not united*.

*

Flowers consisting of a distinct perianth, which is perfectly *regular*, or with the sepals and petals respectively of *equal* size and shape. In a very few cases the sepals are rather *un*equal, and sometimes a calyx *only* is present. Either stamens or pistils, in a perfect state, always present, and usually both stamens *and* pistils.

† Not more than 10 stamens.

Flowers trimerous, p. 58.

Flowers tetramerous, p. 59.

Flowers pentamerous.

Stamens exactly 10, p. 62.

Stamens exactly 5, p. 63.

Stamens 1, 2, 3, 4, 6, 7, 8, or 9, p. 65.

†† More than 10 stamens (usually a considerable number), p. 66.

††† Stamens absent; ovary alone present, p. 68.

**

Flowers with a distinct perianth, which, as in the preceding section, is usually composed of both calyx and corolla, but in form *irregular*, *i. e.*, the component pieces of *different* shapes and sizes. Stamens and pistils both present, either in the same flower or in separate flowers, p. 69.

C.—Stamens and pistils protected by simple scales or bracts, usually very few in number, or even solitary; often exceedingly minute, and sometimes altogether wanting, p. 71.

D.—"Double flowers," p. 73.

II.—*Imperfect or Flowerless Plants*, p. 75.

PARTICULAR CLASSIFICATION.

Flowers regular, simple, with not more than 10 *stamens, and trimerous. (Calyx and corolla usually alike; the latter sometimes absent.)*

A.—Flowers unaccompanied by foliage.

Stamens 3.....*Crocus family*, 399
Stamens 6.
  Flowers solitary .....*Colchicum*, 401
  Flowers clustered.
    Ovary below the flower .....*Snowdrop family*, 397
    Ovary within the flower .....*Lily family*, 387

B.—Flowers accompanied by foliage.

* A trailing, heath-like evergreen, growing upon the moors; leaves linear, dark-green, crowded; flowers axillary, inconspicuous .....*Crowberry* (male fl.), 362

** Not of such habit and place of growth.

† *Leaves parallel-veined (sometimes ribbed).*

Flowers in a solid lateral spike or "spadix," resembling a finger.....*Sweet flag*, 420
Flowers not in a lateral spadix.
  Flowers solitary, minute, in the centre of a small sharp-pointed leaf .....*Butchers' broom*, 391
  Flowers not so situated.
    1. Plant floating on the surface of water. Leaves nearly circular.....*Frog-bit* (male flower), 405
    2. Plant not floating in water.
      a. Flowers brown, dry, and inconspicuous .....*Rush family*, 414
      b. Flowers green, inconspicuous; stigmas feathery. *Triglochin*, 403, 505
      c. Flowers white or gaily-coloured.
        I. Stamens 3 .....*Crocus family*, 399
        II. Stamens 9; pistils 9.....*Butomus*, 403
        III. Stamens 6; pistils numerous.....*Alisma*, 403
        IV. Stamens 6; pistil 1.
          Ovary below the flower.
            Leaves scaly on the surface, and spinous at the edge or point .....*Pine-apple family*, 402
            Leaves glabrous and entire .....*Snowdrop family*, 397
          Ovary within the flower.
            Stamens very hairy.
              Flowers in spikes .....*Narthecium*, 388
              Flowers in sessile umbels .....*Spiderwort*, 408
            Stamens without hairs.....*Lily family*, 387

†† *Leaves net-veined.*

Leaves deliciously aromatic. Shrub or small tree.
Flowers green ..... *Bay-tree*, 169
Leaves not aromatic.
Stem twining ..... *Tamus* (male flowers), 467
Stem not twining.
Stem or edges of leaves prickly; flowers yellow.... *Berbery family*, 150
Plant not in any way prickly.
1. Flowers minute, in irregular panicles..... *Rhubarb family* (some), 133
2. Flowers in long terminal spikes (crimson).... *Purple Lythrum*, 206
3. Flowers minute, in axillary spikes, one or two inches long (yellowish green) ..... *Common Mercury* (male plant), 359
4. Flowers large, terminal, and solitary ..... *True-love family*, 468
5. Flowers axillary, or nearly so.
Two or three small bracts under each flower; perianth green..... *Blite*, 163
No bracts.
Stamens 12; petals absent; calyx coloured. *Cuphea*, 207
Stamens 6.
Styles 3 ..... *Elatine*, 155
Style solitary ..... *Lythrum family*, 206

Flowers regular, simple, with not more than 10 *stamens, and tetramerous. In many cases consisting of calyx only. Stamens generally* 4 *or* 8 (*sometimes* 6, 2 *or* 1).

A.

Stems as fine as hair, twining, and leafless at all times.. *Dodder*, 231

B.

Stems not twining.

* Flowers unaccompanied by leaves, or only very young ones present.

No green leaves at any time; their place supplied by scales; herbaceous, brownish-yellow plant .... *Yellow Bird's-nest* (terminal flower), 164, 538
Flowers appearing early in spring, before the leaves are developed. Shrubs or trees.
Stamens 8 ..... *Mezereon*, 168
Stamens 4.
Ovary below the perianth ..... *Carnelian Cherry*, 348
Ovary within the perianth..... *Elm*, 204

** Flowers accompanied by mature leaves.

† *Leaves all radical.*

a. Flowers in dense oval or cylindrical spikes ..... *Ribwort family*, 274
b. Flowers in loose clusters or racemes ..... *Cabbage family* (some), 111, 115
c. Flowers solitary, terminal, unisexual ..... *Littorella*, 275

†† *Stem more or less clothed with leaves.*

Trees or Shrubs.

Growing parasitic upon trees ..... *Mistletoe*, 347
Growing independently in the earth.
a. Stamens 2, or casually 3.
Both calyx and corolla ..... *Lilac family*, 218
Calyx only; coloured, and remarkably hairy .... *Pimelea*, 168
b. Stamens 4.
Flowers unisexual, monœcious, minute, and sessile ..... *Box-tree*, 361
Flowers bisexual.
Flowers in axillary, almost sessile clusters.
Stamens alternate with the petals ..... *Holly*, 209
Stamens opposite the petals ..... *Buckthorn family*, 207
Flowers in long-stalked corymbs.
Flowers green; ovary free, inside ..... *Spindle-tree*, 208
Flowers white; ovary below. Hardy shrubs.. *Dogwood*, 348
Flowers vermilion, scarlet, or yellow; ovary below. Hot-house plants ..... *Cinchonaceæ* (some), 323
c. Stamens 8.
Ovary below the flower.
Leaves opposite ..... *Fuchsia*, 283
Leaves alternate ..... *Whinberry family*, 343
Ovary free, inside the flower.
Flower consisting of calyx only (usually coloured) ..... *Mezereon family*, 167
Flower with both calyx and corolla.
Leaves with transparent resinous dots..... *Rue family*, 155
Leaves without such dots ..... *Heath family* (some), 127

Herbaceous plants.

Leaves whorled.

Leaves pectinate; plant growing in water ..... *Water Featherweed*, 284
Leaves undivided.
Flower solitary, terminal, large, and green..... *True-love*, 468
Flowers numerous, white, yellow, or pink; small, and usually in panicles ..... *Woodruff family*, 325

Leaves not whorled.

|| *Stamens* 8.

Flowers green, in solid square heads ..... *Musk-root* (terminal flower), 347

Flowers white or coloured.

Consisting of calyx only..... *Golden Saxifrage*, 225

Both calyx and corolla.

Ovary within the flower.

Leave opposite, few, far apart ..... *Chlora*, 215

Leaves scattered, very numerous, closely packed.. *Rose-root*, 127

Ovary below the flower ..... *Fuchsia family*, 279

||| *Stamens fewer than* 8.

* Plant covered with stings. Stamens 4 ..... *Nettle* (male flower), 354

** Plant without stings.

Stamens 1 or 2.

Flowers green (stamen solitary) ..... *Parsley piert*, 186.

Flowers white or coloured..... *Fuchsia family* (some), 279

Stamens 4 or 6.

Stamens 6, 4 long and 2 short..... *Cabbage family*, 111

Stamens 4, all of the same length.

Plant growing in water; leaves parallel-veined.... *Pondweed family*, 408

Plant growing on dry land.

a. Flowers collected into solid terminal heads.

With bracts underneath..... *Scabious family*. 320

Without bracts ..... *Burnet*, 187

b. Flowers axillary, sessile, minute.

With calyx only ..... *Pellitory*, 355

Both calyx and corolla ..... *Centunculus*, 266

c. Flowers neither in heads, nor axillary and sessile.

i. Leaves twice trifoliolate..... *Epimedium*, 151

ii. Leaves pinnate ..... *Bitter-cress*, 115

iii. Leaves fan-lobed ..... *Lady's-mantle*, 187

iv. Leaves doubly pinnatifid; flowers yellow..... *Hypecoum*, 97

v. Leaves deeply two-lobed, veiny ..... *Urtica biloba*, 355

vi. Leaves oblong and undivided, or minutely lanceolate.

a. Flowers minute, with four large white bracts resembling petals ..... *Cornus Suecica*, 348

b. Flowers large, tubular, purplish..... *Field Gentian*, 215

c. Flowers pure white.

Large and few..... *Mœnchia*, 146

Numerous and minute.

Stem upright and repeatedly forked.... *Radiola*, 105

Stem prostrate..... *Pearlweed*, 146

Flowers simple, regular, pentamerous, and with exactly 10 *stamens.*

1. Sepals 2 ..... *Purslane family*, 148
2. Sepals 3. Flowers green ..... *Musk-root* (side fls.), 346
3. Sepals 5, or calyx five-cleft.
   Flowers green (no corolla) ..... *Scleranthus*, 166
   Flowers coloured or white.
   Plant destitute of green leaves; yellowish-brown scales instead of them ..... *Bird's-nest* (lateral flowers), 164, 538
   Plant provided with green leaves.
   A. Leaves trifoliolate ..... *Wood-sorrel family*, 105
   B. Leaves pinnate ..... *Biophytum*, 106
   C. Leaves simple and undivided.
   Flowers with stamens only; the ovaries being on different plants .....
   Flowers red ..... *Rose Lychnis*, 143
   Flowers white ..... *White Lychnis*, 142
   Flowers with both stamens and ovary or ovaries.

A.

Ovary below the flower.

Leaves strongly ribbed ..... *Melastoma family*, 284
Leaves not ribbed.
Spotted with white ..... *Sonerila*, 285
No white spots. Flowers white; filaments dilated ..... *Deutzia*, 319

B.

Ovary free within the flower.

Ovary solitary.
Leaves in radical rosettes; flower-stem leafless ..... *Wintergreen*, 132
Stem clothed with leaves.
Style solitary ..... *Heath family* (some), 127
Styles 2 to 5 ..... *Carnation family*, 140
More than one ovary.
a. Ovaries 2, or styles or stigmas diverging; stigmas sessile.
Shrubs (leaves opposite) ..... *Hydrangea family*, 238
Herbaceous plants ..... *Saxifrage family*, 224
b. Ovaries exactly 5 or 10.
Ovaries unconnected; stigmas sessile; plant remarkably succulent .... *Stonecrop family*, 125
Ovaries 5, attached to the base of a long pillar; stigmas 5, recurved ..... *Geranium family* (some), 99
c. Ovaries more than 10 (insignificant mud-mud-plant) ..... *Frogwort*, 86
D. Leaves simple and divided, often very much so.
Ovaries 2, divergent; stigmas sessile .... *Saxifrage Family*, 224
Ovaries 5, united; style single, long, and erect;
stigmas 5 ..... *Geranium Family*, 99

Flowers simple, regular, pentamerous, and with exactly 5 stamens. (Calyx and corolla both usually present.)

A.

GROWING IN WATER, THE FOLIAGE EITHER SUBMERGED, OR FLOATING UPON THE SURFACE.

Leaves pectinate; flowers lilac ..... *Water Featherfoil*, 265
Leaves circular and undivided; flowers yellow ..... *Villarsia*, 217
Leaves oblong and undivided; flowers rose-coloured.... *Water Persicaria*, 135

B.

GROWING ON LAND, OR IF IN WATERY PLACES, NEITHER SUBMERGED NOR FLOATING.

A. Stems twining.
Plant rough; flowers in panicles ..... *Hop* (male plant), 356
Plant smooth; flowers solitary, or in umbels..... *Convolvulus family*, 229
B. Stems provided with spiral tendrils.
Petals 10. Leaves with large stipules..... *Passion-flower family*, 139
Petals 5, yellow or green.
Plant rough ..... *Cucumber family*, 350
Plant smooth ..... *Vine family*, 151
C. Stem neither twining, nor provided with spiral tendrils.
Flowers appearing before the leaves come out .... *Elm trees*, 204
Flowers and leaves cotemporaneous.
1. Leaves all radical, covered on the upper surface and along the edges with large *glandular red hairs* ..... *Sundew*, 153
2. Leaves minute, closely *appressed* against the stem and twigs. Shrub..... *Tamarisk*, 164
3. Leaves covered with *pellucid dots*. Ovary *inside* the corolla..... *Rue family* (some), 155
4. Leaves resinously glandular, aromatic. Ovary *below* the corolla ..... *Escallonia*, 343
5. Leaves *parallel-veined*, small, rigid, and dry. Green-house shrubs ..... *Epacris family*, 131
6. Yellowish-brown scales instead of leaves .... *Yellow Bird's-nest* (lateral flowers), 164, 538
7. Leaves neither glandular, appressed, dotted, nor parallel-veined.
† Stamens and pistil consolidated into a hard and star-like body ..... *Wax-flower family*, 239
†† Stamens and pistil distinct and unconnected.
|| Anthers forming a large and prominent cone in the centre of the flower.
Leaves all radical ..... *Virginian Cowslip*, 270
Stem clothed with leaves.
Anthers black ..... *Borage*, 235
Anthers yellow ..... *Solanum*, 221

|| Anthers not forming a central and prominent cone.

‡ *Ovary* below *the perianth; petals united.*

Leaves pinnate ..... *Sambucus*, 324
Leaves simple.
Leaves opposite.
Leaves with interpetiolar stipules.
Hardy shrub, with large white berries ..... *Snowberry*, 325
Hot-house plants, without white berries ..... *Cinchonaceæ* (some), 323
Leaves without stipules ..... *Honeysuckle family*, 323
Leaves alternate.
i. Herbaceous plants, with blue or white flowers .... *Bell-flower family*, 286
ii. Evergreen climbing shrub. Flowers in umbels.. *Ivy*, 345
iii. Deciduous and non-climbing shrubs. Flowers in racemes or solitary ..... *Currant family*, 329

‡‡ *Ovary or ovaries free*, inside *the perianth.*

Flowers consisting of calyx only.
a. Leaves opposite; flowers green, minute, in terminal cymes ..... *Scleranthus*, 166
b. Leaves opposite; flowers pinkish, axillary (sea-coast plant) ..... *Glaux*, 542
c. Leaves opposite; flowers large and gay (garden plants) ..... *Marvel of Peru*, 165
d. Leaves alternate.
Leaves with ocreate stipules ..... *Rhubarb family*, 133
Leaves without stipules.
Flowers scarious, surrounded by imbricated bracts, usually coloured..... *Amaranth family*, 163
Flowers herbaceous, green, without bracts .... *Spinach family*, 160
Flowers with both calyx and corolla.
I. Ovaries numerous; corolla white ..... *Frogwort*, 85
II. Ovaries 5, large and distinct; stigmas sessile .... *Stonecrop family*, 125
III. Ovaries 2, large and divergent ..... *Saxifrage family*, 224
IV. Ovary solitary, or apparently so.
Style or stigmas 2 to 5.
Calyx plaited.... ..... *Thrift family*, 273
Calyx not plaited.
Small tree, with pinnate leaves..... *Bladdernut*, 157
Herbaceous plants.
1. Stigmas long and slender ..... *Carnation family*, 140
2. Stigmas capitate..... *Flax family*, 104
3. Stigmas sessile ..... *Parnassia*, 225, 540

Style solitary.
Flowers in incurved racemes, generally blue.
Ovary four-lobed ..... *Borage family* (most), 233
Ovary one-celled (garden annuals) ..... *Phacelia*, &c., 273
Flowers not in incurved racemes.
Trees or shrubs.
Petals combined ..... *Heath family* (some), 127
Petals free ..... *Buckthorn family*, 207
Herbaceous plants.
Petals bearded or fringed upon the inside.... *Gentian family*, 213
Petals not bearded.
a. Stigmas three-cleft ..... *Phlox family*, 271
b. Stigmas 5; carpels 5 ..... *Geranium family*, 99
c. Stigmas 1 or 2.
Stamens opposite the lobes of the corolla ..... *Primrose family*, 263
Stamens alternate with the lobes of the corolla.
Leaves alternate.
Stamens covered with long hairs. *Mullein*, 256
Stamens not hairy.
Calyx usually very unequal .. *Convolvulus family*, 229
Calyx regular, or nearly so.
Ovary four-lobed; lobes one-seeded ..... *Borage family*, 233
Ovary many-seeded ..... *Potato family*, 221
Leaves opposite.
Stigma shaped like an hour-glass ..... *Periwinkle family*, 210
Stigma simple ..... *Gentian family*, 213

Flowers regular, simple, pentamerous, and with one, two, three, four, six, seven, eight, or nine stamens.

Stamens 1 to 3 ..... *Valerian family*, 316
Stamens 2 (or casually 3) ..... *Jessamine family*, 233
Stamens 4.
Plant aromatic ..... *Mint*, 241
Plant scentless ..... *Scabious family*, 320
Stamens 6, 7, or 8.
Trees (stamens 8) ..... *Maple family*, 158
Herbaceous plants.
Flowers bright golden yellow ..... *Agrimony*, 196
Flowers red, white, or green (no corolla) ..... *Persicarias*, 135

Flowers simple and regular, and with more than 10 *stamens. (Usually a considerable number of stamens.)*

A.—Filaments of the very numerous stamens united into a long tube ..... *Mallow family*, 108

B.—Filaments of the stamens unconnected, unless slightly at the base.

* *Plants living in water.*

A. Leaves floating flat upon the surface.
Ovaries absent. Stamens 12 to 20 ..... *Frogbit*, 405
Ovaries present.
Ovaries numerous and free ..... *Water Snow-cups*, 86
Ovaries consolidated into a single body.
Leaves net-veined ..... *Water-lily family*, 81
Leaves parallel-veined ..... *Limnocharis*, 405

B. Leaves raised more or less vertically out of the water.
Stems submerged.
1. Leaves round or heart-shaped ..... *Water-lily family*, 81
2. Leaves long, narrow, and prickly ..... *Water Soldier*, 405
3. Leaves arrow-shaped ..... *Water Arrow-leaf*, 403

C. Leaves lanceolate, on aërial stems; flowers yellow.... *Spear-wort*, 84

** *Plants living on dry land; if by the waterside, not* in *the water, as aquatics.*

† Plant covered with stings like those of nettles ..... *Loasa*, 285

†† Plant destitute of stings.
No leaves; stems remarkably succulent, and often prickly ..... *Cactus family*, 280
Plant more or less leafy.
Flowers with stamens only.
a. Flowers minute, in dense globular heads or oblong spikes ..... *Acacias*, 185
b. Flowers in pendulous corymbs ..... *Begonias*, 351
c. Flowers solitary, or in small upright corymbs. *Rosaceæ* (some), 196
Flowers with both stamens and pistils.
Stem *and flower-stalks* prickly ..... *Rose family* (some), 197
If any prickles, none upon the flower-stalks.

Ovary below the perianth.

Trees or shrubs.

Leaves covered with pellucid dots ..... *Myrtle family*, 279
Leaves dotless.
Flowers crimson ..... *Combretum*, 285
Flowers white or cream-coloured ..... *Mock-orange*, 319

Herbaceous.

Flowers deep yellow ..... *Bartonia*, 285

Ovary or ovaries free within the perianth.

1. Stamens on the receptacle.
   - A. Ovary single.
     - i. Leaves all radical; juice of root blood-coloured.. *Sanguinaria*, 97
     - ii. Stem-leaves opposite.
       - Style single ..... *Cistus family*, 111
       - Styles 2 to 5 ..... *St. John's-wort family*, 90
     - iii. Stem-leaves alternate.
       - Lamina articulated to the petiole, and covered with pellucid dots. Trees ..... *Orange family*, 152
       - Lamina continuous with the petiole, if there be one.
         - Sepals equal.
           - Trees ..... *Lime-trees*, 110
           - Herbaceous or undershrubby plants.
             - *a*. Sepals 2, petals 4 ..... *Poppy family*, 93
             - *b*. Sepals 2, petals 5 ..... *Purslane family*, 148
             - *c*. Sepals 4, petals 4 ..... *Caper family*, 164
             - *d*. Sepals and petals each 5 ..... *Nigella*, 83
         - Sepals unequal.
           - Petals thin, crumpled, fugitive..... *Cistus family*, 111
           - Petals thick, smooth, and enduring..... *Camellia*, 93
   - B. Ovaries 2 to 10.
     - Leaves undivided ..... *Platystemon*, 97
     - Leaves much divided.
       - Petals flat or concave..... *Pæony*, 90
       - Petals with curved tails..... *Columbine*, 89
   - C. Ovaries 12 to 100 or more.
     - *a*. Herbaceous plants.
       - Leaves short, very thick and fleshy, in dense rosettes of 2 to 6 inches across ..... *Houseleek*, 127
       - Leaves thin, never in dense rosettes ..... *Buttercup family*, 82
     - *b*. Scrambling weak-stemmed shrubs with pinnatifid leaves ..... *Clematis*, 90
     - *c*. Noble timber trees..... *Magnolia family*, 97
2. Stamens on the calyx.
   - Ovary solitary.
     - Plant nearly stemless..... *Asarum*, 349
     - Stems conspicuously developed.
       - Herbaceous plants.
         - Petals 6, or if absent, calyx six-cleft ..... *Lythrum family*, 207
         - Petals very numerous..... *Ice-plant family*, 166
       - Shrubs and trees. Flowers pentamerous.
         - Calyx only ..... *Acacias*, 185
         - Both calyx and corolla.
           - Calyx fleshy, and adherent to the carpels.... *Apple family*, 187
           - Ovary quite free ..... *Plum family*, 190
   - Ovaries 6—8 to 50—60 or more ..... *Rose family*, 193

Flowers simple and regular, destitute of stamens, but provided with ovaries. (The stamens in separate flowers, either upon the same plant, or a different one.)

* Plant living in water.

1. Leaves circular, floating on the surface.....*Frogbit*, 405
2. Leaves pectinate, plant almost wholly submerged....*Feather-weed*, 284
3. Leaves minute, egg-shaped, entire, in threes .....*Anacharis*, 406

** Plant parasitic on trees.

Branches dichotomous. Leaves entire .....*Mistletoe*, 347

*** Plant living on land, with its roots in the earth.

A. Stem provided with tendrils.
Flowers large, yellow, axillary, and solitary .....*Cucumber family*, 350
Flowers small, greenish, in loose clusters of five or six.....*Bryony*, 351

B. Stem twining. Flowers in loose racemes .....*Tamus*, 407

C. Stems all prostrate. Leaves linear.....*Crowberry*, 362

D. Stem erect.
Plant covered with stings .....*Nettle*, 356
Destitute of stings.
1. Leaves pinnate (tree) .....*Sumach*, 152
2. Leaves septate .....*Hemp*, 355
3. Leaves ternate .....*Garden Strawberry*, 202
4. Leaves fan-lobed.
Flowers solitary .....*Cloudberry*, 201
Flowers in corymbs .....*Begonia*, 351
5. Leaves pinnatifid.
Flowers solitary, very large .....*Pæony*, 90
Flowers minute, in little corymbs .....*Valerian*, 316
6. Leaves simple, undivided, and *symmetrical*.
Blotched with yellow (shrub) .....*Aucuba*, 348
Uniform green.
Tree or shrub .....*Bay-tree*, 169
Herbaceous.
a. Flowers axillary, green; ovaries 2...*Mercury*, 359
b. Flowers in corymbs; ovary free, inside.
Flowers red .....*Rose Lychnis*, 143
Flowers white .....*White Lychnis*, 142
c. Flowers in corymbs; ovary three-cornered, beneath .....*Begonia*, 351
7. Leaves simple, undivided, larger upon one side of the midrib than on the other .....*Begonia*, 351

Flowers with a distinct perianth, which is usually composed of both calyx and corolla, but in form irregular, *i. e., the component pieces of* different *shapes and sizes. Stamens and pistils both present, either in the same flower or in different flowers.*

1. No green leaves at any time; their place supplied by scales. Stem simple ..... *Toothwort family*, 212
2. Leaves provided with tendrils.
   Leaves opposite; stamens 4 or 2 ..... *Bignonia family*, 240
   Leaves alternate.
   Leaves with stipules ..... *Pea family*, 169
   Leaves without stipules ..... *Fumitory family*, 148
3. Leaves minutely subdivided and hung with little bladders. Plant growing in water ..... *Bladderwort*, 277
4. Leaves binate, trifoliolate, or pinnate, and *with stipules* ..... *Pea family*, 169
5. Leaves contracted into green thorns; flowers yellow ..... *Furze*, 170
6. Flowers in compound umbels, *usually white* ..... *Parsley family*, 331
7. Flowers in dense terminal umbellate clusters; corolla with a long and minute tube and spreading limb; stamens 4, didynamous ..... *Verbena family*, 271
8. Flowers with a beard-like tuft projecting in front. Corolla closed ..... *Polygala*, 156
9. Flowers butterfly-shaped ..... *Pea family*, 169
10. Leaves lanceolate, powerfully lemon-scented; flowers white, minute, in panicles ..... *Lemon-plant*, 270
11. Not answering to any of the previous characters.

A.—*Leaves parallel-veined.*

*

Veins of the leaves flowing from the midrib to the margin. (Hot-house plants.)
Stamen solitary ..... *Ginger* and *Arrow-root families*, 401
Stamens nearly or quite 6 ..... *Banana family*, 407

**

Veins of the leaves proceeding in curves from the base to the apex.
Stamens and stigma consolidated; flower with a large pendulous lower lip ..... *Orchis family*, 391
Stamens and pistil distinct and unconnected.
Stamens 6 ..... *Alstræmeria*, 399
Stamens 3. Flowers in unilateral racemes, red or yellow ..... *Gladiolus*, 400

B.—*Leaves net-veined.*

A. No stamens; some leaves pinnatifid ..... *Small Marsh Valerian*, 318
B. Only one stamen; leaves undivided; flowers red.. *Red Valerian*, 318
C. Stamens 2 or more.

Stamens 2.
Leaves all radical; flower solitary ..... *Butterwort*, 277
Stem clothed with leaves.
Ovary four-lobed, ripening into four seed-like fruits ..... *Sage family* (some), 241
Ovary single, two-celled, ripening into a many-seeded capsule.
Numerous large bracts among the flowers .... *Justicia family*, 252
Bracts not remarkable.
Placenta parietal (hot-house plants)..... *Gloxinia family*, 261
Placenta axile ..... *Foxglove family*, 252

Stamens 3.
Leaves undivided ..... *Blinks*, 148
Leaves more or less pinnatifid ..... *Small Marsh Valerian*, 317

Stamens 4 (sometimes a fifth without an anther).
a. Two long stamens and two short ones.
1. Corolla two-lipped and closed ..... *Foxglove family*, 252
2. Corolla two-lipped and open.
Leaves alternate or scattered ..... *Foxglove family*, 252
Leaves opposite.
Ovary four-lobed, ripening into four seed-like fruits ..... *Sage family* (most), 241
Ovary two-celled, ripening into a many-seeded capsule..... *Foxglove family*, 252
3. Corolla tubular, four or five-lobed.
Ovary four-lobed, ripening into four seed-like fruits ..... *Sage family*, 241
Ovary single, two-celled.
Seeds winged ..... *Bignonia family*, 240
Seeds wingless.
Bracts usually many and large..... *Justicia family*, 252
Bracts not remarkable ..... *Foxglove family*, 252
b. Stamens all of the same length.
Green-house evergreen shrubs, with dry, stiff leaves ..... *Protea family*, 168
Herbaceous plants.
Ovary below the perianth; flowers in heads ..... *Scabious family*, 320
Ovary free, inside the perianth.
Ovary four-lobed, lobes one-seeded ..... *Sage family*, 241
Ovary two-celled, many-seeded..... *Foxglove family*, 252

Stamens 5.
Ovary below the perianth.
Shrubs and small trees ..... *Honeysuckle family*, 323
Herbaceous plants.
Anthers united ..... *Lobelia family*, 319
Anthers free ..... *Parsley family*, 331
Ovary free inside the perianth.
Shrubs ..... *Azaleas*, 131
Herbaceous plants.
a. Flowers blue, in incurved racemes ..... *Echium*, 235
b. Calyx extended at the back into green wings .. *Viola*, 122
c. Stamens shaggy with coloured hairs ..... *Mullein*, 256
d. Sepals 2; flowers white ..... *Blinks*, 148
e. Perianth in six pieces, one of them arched .. *Balsam family*, 97
Stamens 6.
1. Perianth single, tubular, and inflated ..... *Birthwort*, 349
2. Corolla of four distinct petals ..... *Cabbage family*, 115, 121
3. Petals cohering at the tips, and forming a pouch for the anthers ..... *Fumitory family*, 148
Stamens 7.
Trees with quinate or septate leaves ..... *Horse-chesnuts*, 157
Herbaceous or under-shrubby plants: flowers in umbels ..... *Pelargoniums*, 103
Stamens 8.
Ovary below the perianth, long and slender ..... *Willow-herb*, 281
Ovary within the perianth.
Flowers large and shewy; ovary three-lobed .... *Trophy-wort*, 107
Flowers minute and inconspicuous; ovary undivided ..... *Polygonum*, 135
Stamens 10.
Plant with long thread-like runners ..... *Pendulous Saxifrage*, 228
No runners.
Leaves pinnate ..... *Fraxinella*, 155
Leaves simple. Shrubs ..... *Rhododendron*, 131
Stamens more than 10.
Ovary three-valved, open at the top ..... *Mignonette family*, 121
Ovaries 2 or more; if solitary, not three-valved .... *Buttercup family*, 82

Stamens and pistils protected by simple scales or bracts, usually very few in number, or even solitary; often exceedingly minute, and sometimes altogether wanting.

A.—Trees or shrubs.

* *Flowers appearing previously to the leaves.*

Flowers in panicles ..... *Ash-tree*, 219
Flowers in little globular clusters.
Deep brownish-red ..... *Elm*, 204
Yellowish buff-colour ..... *Larch* (male flower), 462

Male flowers in catkins, females in catkins or buds.
Bracts large, entire, and connate ..... *Garrya*, 385
Bracts entire, not connate.
Stamens under each bract 2 ..... *Willow*, 375
Stamens 4 to 8, catkins very small ..... *Sweet Gale*, 384
Stamens 8... ..... *Hazle*, 365
Bracts jagged and hairy ..... *Poplar*, 379

** *Flowers in company with the opening leaves.*

Twigs covered with scars of former leaves ..... *Larch*, 462
No conspicuous scars; male flowers in catkins, and females usually so.
Stamens under each bract not more than 5 ..... *Willow*, 376
Stamens more than 5 ..... *Oak* and *Birch families*, 365, 370

*** *Flowers cotemporaneous with fully developed leaves.*

Leaves simple, needle-shaped ..... *Fir-tree family*, 459
Leaves simple, lanceolate.
Surfaces all in one plane ..... *Yew-tree*, 466
Surfaces not in one plane ..... *Willows*, 376
Leaves simple, cordate, 2 to 3 inches across ..... *Mulberry*, 382
Leaves simple, fan-lobed; lobes 5 to 7 ..... *Fig-tree*, 382
Leaves simple, minute, appressed ..... *Cupressineæ*, 461
Leaves pinnate, aromatic; flowers green ..... *Walnut*, 384
Leaves pinnate, scentless; flowers crimson ..... *Sumach*, 153

B.—Herbaceous plants.

1. Aquatic.
Wholly submerged.
Leaves linear, undivided ..... *Zannichellia*, 411
Leaves forked ..... *Water Horn-wort*, 361
Floating or close to the surface.
Distinct stems and leaves ..... *Water Star-weed*, 383
Plant consisting only of horizontal green plates... *Duckmeat*, 418
2. Marsh or semi-aquatic, growing erect.
Flowers in dense clubs several inches long ..... *Bulrush*, 413
Flowers in globular heads ..... *Water-burr*, 413
Flowers in loose panicles, open spikes, or catkins.
Sheath of leaves tubular ..... *Sedge family*, 441
Sheath of leaves open at the side ..... *Grass family*, 421
3. Dry land plants.
Flowers with a large spathe and spadix ..... *Arum family*, 411
Stems usually milky-juiced; ovary three-lobed.... *Spurge*, 359
Leaves linear, parallel-veined.
Sheath of leaves tubular ..... *Sedge family*, 441
Sheath of leaves open at the side ..... *Grass family*, 421
Stems twining; flowers in green cones ..... *Hop* (female flower), 356

Double Flowers.

Plant living in water; flowers several inches across.... *Water-lily*, 81
Living on dry land.

A.—Shrubs or trees.

1. No flat green leaves; their place taken by innumerable thorns. Flowers rich yellow..... *Furze*, 177
2. Leaves pinnate; stems usually prickly ..... *Rose*, 203
3. Leaves simple and feather-lobed. Branches armed with spines ..... *Hawthorn*, 188
4. Leaves simple and undivided.
   - *a*. Leaves minute, closely imbricated ..... *Heather*, 130
   - *b*. Leaves covered with pellucid dots ..... *Myrtle*, 279
   - *c*. Leaves thick and very glossy; flowers 2 to 4 inches across; petals enduring, red or white..... *Camellia*, 93
   - *d*. Leaves thin, not glossy.
     - Flowers white; petals soon falling ..... *Cherry*, 192
     - Flowers yellow; leaves deeply serrate and acuminate ..... *Kerria*, 204
     - Flowers yellow; leaves entire ..... *Dyers' Green-weed*, 177, 178

B.—Herbaceous plants.

* *Leaves either compound, or deeply cut and divided.*

Leaves of 5 very small leaflets; flowers yellow ..... *Lotus*, 177, 180
Leaves variously pinnatifid or fan-lobed.
- Juice of stem milky or orange-coloured.
  - Flowers yellow..... *Celandine*, 96
  - Flowers of nearly every colour except yellow..... *Poppy*, 97
- Juice of stem colourless and watery.
  - Calyx (anthodium) formed of numerous imbricated bracts..... *Daisy family (Dahlia, African marigold, &c.)*, 290
  - Calyx of not more than 5 sepals, or not present as a green cup.
    - A. Flowers solitary, with a large involucre about an inch underneath ..... *Anemone*, 89
    - B. Flower solitary, without involucre; leaves finely divided ..... *Ranunculus*, 89
    - C. Flower solitary, six to nine inches across .... *Pæony*, 90
    - D. Flower solitary; leaves simply 3-lobed ..... *Hepatica*, 89
    - E. Flowers in spikes, racemes, or corymbs.
      - *a*. One of the floral leaves spurred ..... *Larkspur*, 90
      - *b*. Many of the floral leaves spurred; the spur curved ..... *Columbine*, 89

c. No spurs.
Leaves fan-lobed and divided .....*Buttercup family*, 82
Leaves feather-lobed or pinnate.
Flowers yellow.....*Barbarea*, 118
Flowers whitish or lilac.....*May-flower*, 118

** *Leaves little or not at all divided.*

1. Calyx twofold, an inner one and an outer one.
Stems five to eight feet high.....*Hollyhock*, 109
2. Calyx (anthodium) formed of numerous imbricated
bracts .....*Daisy family*, 290
3. Calyx simple, consisting of not more than 5 sepals;
sometimes coloured, or apparently absent.

† Leaves parallel-veined; all radical, or very nearly so, and never *opposite*.

Flowers in upright racemes .....*Hyacinth*, 390
Flowers solitary.
A membranous spathe remaining attached to the peduncle. Flowers lateral or drooping.
a. Petals white, streaked with green .....*Snowdrop*, 398
b. Petals white, or white with an admixture of pink-edged or yellow ones .....*Narcissus*, 398
c. Petals yellow, or yellow and orange intermingled .....*Daffodil* and *Jonquil*, 398, 399
No spathe, flowers erect.....*Tulip*, 390

†† Leaves net-veined.

‖ *Leaves all, or nearly all, radical.*

1. Flowers in thin panicles, white .....*Meadow Saxifrage*, 226
2. Flowers in simple and regular umbels.
Leaves smooth, mealy .....*Auricula*, 270
Leaves much puckered .....*Polyanthus*, 269
3. Flowers in an irregular cluster of 3 to 5, orange-yellow. Leaves heart-shaped; stem hollow ....*Marsh marigold*, 89
4. Flowers solitary.
Leaves 3-lobed .....*Hepatica*, 89
Leaves quite simple.
Leaves heart-shaped, glossy.
Flowers yellow, scentless .....*Pilewort*, 89
Flowers blue or white, fragrant .....*Violet*, 124
Leaves oblong, much puckered .....*Primrose*, 268

‖‖ *Flower-stem leafy.*

Leaves alternate.
a. Leaves roundish, lower ones on long stalks .....*Meadow Saxifrage*, 226
b. Leaves peltate .....*Dwarf Trophy-wort*, 107

c. Leaves oblong, lanceolate, or ovate-lanceolate.
Juice of stem milky ..... *Poppy*, 97
Juice of stem watery and colourless.
Leaves serrated more or less ..... *Rocket*, 571
Entire or very nearly so.
Glabrous ..... *Wall-flower*, 121
Hoary with fine white hairs ..... *Stock*, 121
Leaves opposite.
Stems semi-transparent ..... *Balsam*, 99
Stems opaque.
Glaucous ..... *Pink* and *Carnation*, 147
Green ..... *Lychnis* and *Soapwort*, 143, 144
Viscid, especially above ..... *Petunia*, 223

Flowerless Plants.

1. Plant with distinct roots or rootstocks, and leaves or green branches.
Fructification on the back of the leaf ..... *Ferns*, 469
Fructification in terminal spikes.
Stem leafless, or with whorled branches, or with sheaths at the joints ..... *Horsetails*, 485
Stem clothed with abundance of small green leaves ..... *Lycopodium*, 483
Stem with one large leaf below the spike ..... *Adder's-tongue*, 476
Fructification in terminal panicles ..... *Ferns*, 476
Fructification in the axils of minute leaves, or upon the general surface of the plant.
Thecæ sessile, land plants ..... *Lycopodium*, 483, *Riccia*, 507
Thecæ sessile, pondside plant ..... *Pillwort*, 484
Thecæ stalked.
Opening with a lid ..... *Mosses*, 488
Opening with 4 or 8 valves ..... *Marchantia family*, 506
2. No distinct roots or rootstocks.
Water-plants (usually) and green (usually) ..... *Chara* and *Sea-weed families*, 519, 529
Land plants, scarcely ever green.
Usually dry and crisp ..... *Lichens*, 510
Usually spongy or watery ..... *Mushroom family*, 520

KEY, BY MEANS OF THE LEAVES, TO THE TREES AND ARBORESCENT AND CLIMBING SHRUBS,

OF NOT LESS THAN NINE FEET HIGH, COMMONLY SEEN GROWING, EITHER WILD OR CULTIVATED, IN THE OPEN AIR, NEAR MANCHESTER.

(Woody plants of less than nine feet high cannot be classified by their leaves alone. Many are well-marked, and easily described, but there are numbers so closely alike that the foliage is not enough for their discrimination.)

A.

Leaves exceedingly minute, and pressed close to the surface of the branches and twigs ..... *Cypress & Arbor Vitæ*, 464

B.

Leaves needle-shaped, or not more than a sixteenth of an inch in width.

Growing singly, or three or five together..... *Fir-tree family*, 460

Growing in tufts.

Perennial, dark-green, and four-cornered ..... *Cedar*, 461

Annual, light-green, and flat..... *Larch*, 461

C.

Leaves parallel-veined, narrow, and very numerous.

Branches of the tree whorled ..... *Chili Pine*, 464

Branches spreading irregularly ..... *Yew-tree*, 465

D.

Leaves never less than half to three-quarters of an inch in width at the broadest part, often several inches in width, net-veined or feather-veined, flat and spreading.

1. Quinate, septate, or digitate.

Tall upright trees ..... *Horse-chesnuts*, 157

Slender climber against walls ..... *Virginian Creeper*, 152

2. Trifoliolate ..... *Laburnum*, 184

3. Pinnate.
   Stem weak, climbing and scrambling, often trained against walls.
   Stem more or less prickly. Leaves stipulate.. *Rose*, 197, 203
   Entirely without prickles and stipules..... *Clematis*, 90
   Stem erect and independent.
   a. Leaflets 7, aromatic when bruised (large tree) *Walnut*, 384
   b. Leaflets 5, smelling disagreeably when bruised..... *Elder*, 324
   c. Leaflets very numerous, smelling disagreeably..... *Ailantus*, 572
   d. No remarkable scent.
   Leaflets entire.
   Stipules converted into large thorns.... *Robinia*, 184
   Stipules inconspicuous ..... *Bladder Senna*, 185
   Leaflets serrate.
   Leaflets 5 to 7.
   Leaves opposite ..... *Bladder-nut*, 157
   Leaves alternate ..... *Rose*, 197
   Leaflets 7 to 11 ..... *Ash-tree*, 219
   Leaflets 11 to 19, or many more.
   Twigs very woolly; leaflets mostly 23.. *Sumach*, 152
   Twigs glabrous ..... *Mountain-ash*, 189
4. Doubly or triply pinnate or pinnatifid.
   Branches armed with enormous thorns..... *Gleditschia*, 172
   Branches thornless..... *Elder*, var. *laciniata*, 325
5. Simple and lobed, with only one principal vein from the base.
   Extremity of leaf cut off almost horizontally.. *Tulip-tree*, 97
   Extremity rounded or pointed.
   Branches spinous ..... *Thorns*, 188, 189
   Branches not spinous.
   Leaves remarkably white underneath.
   Feather-veined..... *Pyrus hybrida*, 189
   Lateral veins irregular. (Fig. 195) .... *White Poplar*, 380
   Green on both surfaces.
   Leaves opposite ..... *White Jessamine*, 233
   Leaves alternate.
   Bark of trunk smooth..... *Beech*, var. *laciniata*, 365
   Bark rugged ..... *Oaks* (Figs. 26, 189), 365
6. Simple and regularly fan-lobed.
   a. Stems twining..... *Hop*, 356
   b. Stems climbing, but not twining.
   By means of suckers. (Fig. 181)..... *Ivy*, 340
   By means of tendrils.
   Large stipules..... *Blue Passion-flower*, 140
   No stipules ..... *Grape Vine*, 151

c. Stems erect and independent.
Sap like milk .....*Fig-tree*, 382
Sap not milky.
Leaves opposite.
Stipules and glands on the petiole....*Guelder-rose*, 325
No stipules or glands.....*Sycamore* and *Maples*, 158
Leaves alternate.
Four to five inches across (large tree) *Plane*, 381
One to two inches across .....*Spiræa opulifolia*, 203

7. Simple and undivided.

A. Feather-veined, distinctly and very elegantly. (Fig. 40.)
Leaf three to five times as long as broad .....*Spanish Chesnut*, 365
Leaf oval or roundish.
1. Remarkably white underneath.....*White-beam*, 189
2. Blade larger on one side of the midrib. (See Fig. 133) .....*Elm*, 204
3. Roundish, with a large projecting point at the top .....*Hazle-nut*, 365
4. Roundish and obtuse. (Fig. 190) .....*Alder*, 371
5. Oval or elliptical.
Serrate. (Fig. 188) .....*Hornbeam*, 365
Entire or nearly so. (Fig. 186) .....*Beech*, 365

B. Lateral veins spreading irregularly. (Fig. 41.)
i. Stems climbing by means of suckers .....*Ivy*, 346
ii. Stems twining.....*Honeysuckle*, 325
iii. Stems erect and independent.
a. Leaves aromatic.....*Bay-tree*, 169
b. Leaves more or less prickly.....*Holly*, 209
c. Trunk remarkably white (tall tree).....*Birch*, 371
d. Blade roundish or cordate.
Leaves opposite .....*Lilac*, 220
Leaves alternate.
Petiole compressed laterally .....*Aspen*, 380
One side larger. (Fig. 97).....*Lime-trees*, 110
Very rough .....*Mulberry*, 382
e. Blade triangular or rhomboid .....*Poplars*, 379
f. Blade lanceolate, five to six inches long.
Narrow lanceolate.
Trained against walls.....*Peach*, 192
Growing independently.
With white silky hairs on both sides..*White Willow*, 377
Glabrous.
Serrate .....*Willows*, 376, 381
Almost entire .....*Almond*, 192

Broadly lanceolate.
Evergreen ..... *Laurel*, 192
Mostly deciduous ..... *Magnolia*, 97

g. Blade lanceolate, or ovate-lanceolate, one to three inches long.

Leaves alternate.
1. Branches spinous; spines 3 together.. *Berbery*, 150
2. Spinous; spines solitary.
Stipules remarkably large..... *Pyrus Japonica*, 189
Stipules not remarkable; berries scarlet ..... *Pyracantha*, 190
3. No spines; evergreen.
Woolly or whitish underneath ..... *Evergreen Oak*, 370
Green on both sides.
Thin and very shining ..... *Portugal Laurel*, 192
Thick and dull green.
1—2 inches long, serrate ..... *Alaternus*, 208
3—6 inches long, entire..... *Rhododendron*, 131
4. No spines; deciduous ..... *Apple*, &c., 189
Plum, &c., 192
Willows, 376, 381

Leaves opposite.
Entire ..... *Lilac*, 220
Serrate, more or less..... ..... *Spindle-tree*, 209
Loniceras, 325
Mock-orange, 319

THE MANCHESTER FLORA.

PERFECT, OR FLOWERING PLANTS.

Class I.—EXOGENS.

Section 1.—BISEXUAL EXOGENS.

GROUP I.—OVARY FREE AND ENCLOSED; STAMENS ON THE RECEPTACLE.

I.—THE WATER-LILY FAMILY. *Nymphæáceæ.*

Pond and river plants, with large, oval or heart-shaped, undivided and leathery leaves, supported on petioles as many feet long as the water is deep, and lying flat upon the surface. Flowers shewy, regular, two to twelve inches across, white, yellow, rose-coloured, or blue. Petals and stamens numerous; ovary solitary, many-celled, crowned with sessile stigmas, which correspond in number with the cells, and radiate upon its summit in a star-like manner.

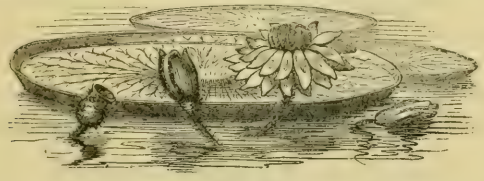


Fig. 86.
Victoria regia, the largest known water-lily.

The noblest and most beautiful of aquatics, vieing with the magnolias and the night-blowing Cereus, and truly, as the Indians call them, the "Delight of the Waters." They grow throughout the northern hemisphere, wherever tempted by a clear lake or quiet

stream, and give to their habitations quite a tropical air. About fifty kinds are known, the acmé of magnificence being attained in the superb *Victoria régia* of Guiana, cultivated along with several smaller species, in the conservatory at the Botanic Gardens.

Three species grow wild in England, and two of them near Manchester.

1. Flowers white. Sepals four, flat, green upon the outside, but upon the inner surface white, like the petals, which they equal in size. Fruit resembling a small poppy-head..... } White Water-lily.
2. Flowers yellow. Sepals five or six, concave, much larger than the petals. Fruit shaped like the Portland Vase ..... } Yellow Water-lily.

HABITATS AND LOCALITIES.

1. White Water-lily—(*Nymphæa álba.*)

In ponds upon nearly every side of Manchester. Moston, Stretford, Baguley, Eccles, Leigh, Cheadle, Rostherne Mere. Fl. July, August.

Curtis, iii. 500; E. B. iii. 160; Baxter, iii. 181.

The ovary in the genus *Nymphæa* is nearly concealed by a peculiar fleshy disk, rising out of the receptacle, and which bears the petals and stamens. Hence the latter appear to grow upon its surface, though in reality truly hypogynous.

2. Yellow Water-lily—(*Núphar lútea.*)

Similarly diffused, especially upon the south-side of the town. Lymm, Cheadle, Eccles, Mere Mere, Rostherne Mere, Leigh. Fl. June—August.

Curtis, iii. 501; E. B. iii. 159 (as *Nymphæa*); Baxter, iv. 281.

II.—THE BUTTERCUP FAMILY. *Ranunculáceæ.*

Herbaceous plants (except the Chinese pæonies and most kinds of *Clématis*), with simple, exstipulate, and usually much-divided leaves, their juices thin, watery, and usually acrid. Sepals and petals usually five each, and for the most part symmetrical, but with many departures from uniformity, both in figure and proportion. The petals are often absent, or very minute, and converted into honey-cups, and the sepals brilliantly developed in their stead, as in the

anemone and the hellebore; while in other cases the flower is curiously spurred, or the upper sepal is converted into a hood. There are examples of only three sepals, and of as many as nine or ten petals. Stamens seated on the receptacle, five, ten, or twenty to a hundred or more, the higher numbers predominating. Pistils one to a hundred, the higher numbers again most usual, perfectly distinct, except in the exotic genus *Nigélla*, where the ovaries are united. The fruit consists in general either of many-seeded follicles, or of dry achenia, which in the *Clématis* and others are provided with hairy tails. A strong tendency to become double is manifested both in the regularly-formed flowers and in the irregular.

Natives principally of northern temperate latitudes, and adorning them everywhere, from the beginning of spring till the end of summer, with bright and copious bloom of every colour, few families are more abundant than the Ranunculaceæ, or do more for the embellishment of their native soil. But alas for gay attire; not a single species is fit for food, or of other economic service, while their general properties are caustic and poisonous. The spearwort and celery-crowfoot of our ditches will blister the skin; and the hellebores and the aconites, taken internally, are fatal. None are worse in this respect than the common purple monkshood, or *Aconitum Napéllus*, (E. B., Supp. ii. 2730.) the roots of which, mistaken for horse-radish, have frequently caused death. Notwithstanding its noxious qualities, this plant enjoys a place in every flower-garden, and is not infrequently seen growing even by the side of kitchen vegetables, where it should never be permitted. Its tall panicles of irregular purple flowers, one of which is represented in Fig. 51 (p. 25), last from early summer to October. The leaf is represented in Fig. 30 (p 16). The properties in question have given the family repute in medicine; but although used from the earliest times, few species appear to be really serviceable.

A thousand species are known, thirty-two of them growing wild in England, and nineteen in the neighbourhood of Manchester, the blossoms in every case regular, with flat or concave sepals and petals, except in the columbine, where the latter resemble five little cornucopias. This species, the marsh-marigold, and the globe-flower, have follicles for their fruit, and the remainder small dry achenia. They may be separated, for convenience of descriptive analysis, into those that have yellow flowers, and those that are not yellow:—

THE BUTTERCUP FAMILY.

SECTION 1.

YELLOW-FLOWERED.

- **A.—All the leaves long, narrow, lanceolate, and undivided.**
  - Flowers an inch across; stems two to three feet high ..... 7. GREAT SPEAR-WORT.
  - Flowers half-an-inch across; stems eight to twenty inches high ..... 6. COMMON SPEAR-WORT.
- **B.—All the leaves heart-shaped and undivided; flowers brilliant yellow.**
  - Sepals five or six, resembling petals, broad and oval; corolla absent ..... 17. MARSH MARIGOLD.
  - Sepals three, greenish; petals about nine, long and narrow ..... 16. PILE-WORT.
- **C.—Leaves deeply and variously fan-lobed and divided.**
  - Ovaries in an oval head, projecting beyond the corolla ..... 15. CELERY-LEAVED CROWFOOT.
  - Ovaries not projecting.
    - Flower globular; the sepals large, numerous, concave, resembling petals, pale yellow, and concealing the stamens ..... 18. GLOBE-FLOWER.
    - Flower open, cup-shaped, disclosing the stamens to view. Sepals 5.
      - Sepals reflexed.
        - Root round, solid, and perennial; petals round and brilliant ..... 11. ROUND-ROOTED BUTTERCUP.
        - Root fibrous, and annual ..... 12. HAIRY BUTTERCUP.
      - Sepals spreading.
        1. Stems partly erect and partly prostrate, the latter rooting at the joints ..... 10. CREEPING BUTTERCUP.
        2. Stems weak, nearly prostrate; leaves roundish; whole plant hairy; annual; petals small and narrow ..... 14. SMALL-FLOWERED CROWFOOT.
        3. Stems all erect
           - Plant hairy; petals round and shining ..... 9. COMMON MEADOW BUTTERCUP.
           - Plant glabrous, or nearly so.
             - Leaves all deeply cleft; annual ..... 13. CORNFIELD CROWFOOT.
             - Lower leaves round and shining; perennial .. 8. WOOD CROWFOOT.

- A.—Flowers white, or with a purplish tinge outside.
  - Plant upright, growing on dry land, stem six inches high, one-flowered; sepals six; petals absent; leaves ternate and cut ..... 1. Wood Anemone.
  - Plant prostrate, floating in water, or creeping on mud.
    - Stamens numerous; petals much longer than the calyx; plant floating in water ..... 3. Water Snow-cups.*
    - Stamens about five or ten; petals about as long as the calyx. Plant creeping on mud.
      - Carpels obtuse ..... 4. Ivy-leaved Frog-wort.*
      - Carpels pointed ..... 5. Mud Frog-wort.*

B.—Flowers blue, purple, or dull red; petals five, ending in a curved tail; sepals five; leaves thrice ternate; stem two feet high ..... 19. Columbine.

C.—Flowers vivid scarlet; petals eight, concave, scarcely longer than the five sepals; leaves thrice pinnatifid, with linear segments; stem eighteen inches high ..... 2. Pheasant's-eye.

THE BUTTERCUP FAMILY.

Section 2.

FLOWERS NOT YELLOW.

* That these three are really distinct, none but hair-splitters would desire to contend. The characters by which they are distinguished are uncertain, and only such as in many parallel cases are allowed to be casual, and resulting from place of growth. The whole might legitimately be included under the general name *aquatilis*.

HABITATS AND LOCALITIES.

1. Wood Anemone—(*Anémone nemorósa.*)

One of the grand, sweet prodigalities of nature, filling every wood and little copse in early spring with its graceful, half-pendulous white flowers.

Curtis, i. 111; E. B. v. 355; Baxter, i. 43.

The flowers are often rose-coloured, especially on the outside, and occasionally purple, and even blue; sometimes also double, and now and then with the white sepals half-converted into pinnatifid green leaves.

2. Pheasant's-eye—(*Adónis autumnális.*)

Very rare. Corn-fields near Hyde and Ashton-upon-Mersey. (Mr. J. Sidebotham.) Fl. July—October. Annual.

Curtis, i. 110; E. B. v. 308; Baxter, i. 7.

Common in gardens.

3. Water Snow-cups—(*Ranúnculus aquátilis.*)

Common in ponds and ditches, west, south, and south-west of Manchester, as at Bowdon, Stretford, Sale, Hough-end, Bedford, &c., floating upon the surface. Fl. May, June.

E. B. ii. 101.

The only British Ranunculus that floats in water, from which circumstance, and the similarity of its blossoms, it is in some places prettily called the water-anemone. Few plants make a more beautiful shew in their season. At the end of May, when the snowy white blossoms are in perfection, they form patches many feet across, growing as close together as plum or cherry bloom. The submerged leaves are cut and divided as fine as hair, while the floating ones are round and lobed, presenting the curious spectacle of two varieties of foliage on the same stem. Occasionally the leaves are all of the divided kind, when the plant takes the name of *pántothrix*. It makes an excellent Aquarium plant.

4. Ivy-leaved Frog-wort—(*Ranúnculus hederáceus.*)

In the mud bordering slow and shallow rivulets, and where water has stood during winter, and left a wet hollow, common. Fl. summer.

Curtis, ii. 259; E. B. xxviii. 2003.

5. Mud Frog-wort—(*Ranúnculus cœnósus.*)

In similar situations at Hough-end, and between Dunham and Carrington, plentiful. (Mr. Hunt.) Fl. summer.

6. Common Spear-wort—(*Ranúnculus Flámmula.*)

Ditches and marshy places, everywhere. Fl. July, August.

Curtis, ii. 401; E. B. vi. 387.

7. Great Spear-wort—(*Ranúnculus Língua.*)

Marshy places and edges of lakes, rather rare. Timperley; Radnor Mere, in Alderley Park; pond near Besses-o'th'-Barn; plentiful in the Lime Pits, Bedford, at Capesthorne and the neighbourhood, and in Pedmore Hollow, near Knutsford. Fl. July, August.

Curtis, iv. 622; E. B. ii. 100.

The noblest of the English buttercups.

8. Wood Crowfoot—(*Ranúnculus auricomus.*)

Borders of woods and in similar shady places. Abundant near Cotterill Clough, and between there and Ashley Meadows. Sparingly at Reddish, Pendlebury, Worsley, and Agecroft. Fl. end of April to end of May.

Curtis, i. 114; E. B. ix. 624.

The only British Ranunculus that grows habitually in the shade of trees, and the most elegant of our native species. The stems are seldom more than a foot high, erect and branched; the root-leaves on long stalks, kidney-shaped, with a few broad round lobes, and the margin crenulate; and the stem-leaves few and sessile, and divided to the base into narrow segments. The flowers that first open are frequently without petals; those that follow have often not more than two or three; the full number of five appearing only when the season is somewhat advanced, the progress of the plant to its perfection being concurrent with that of the leafing of the trees that overhang it. The delicate slenderness and glossy yellow hue of the herbage, as well as of the flowers, gained for it with the early botanists the name of "goldilocks," of which "*auricomus*" is the Latin. It is one of the few species that are not acrid.

9. Common Meadow Buttercup—(*Ranúnculus ácris.*)

Everywhere in meadows and pastures, and common in gardens, with double flowers. Fl. May—July.

Curtis, i. 39; E. B. x. 652; Baxter iv. 302.

Buttercups are often supposed to give the yellow colour to spring butter. But cattle in general have a strong aversion to them, on account of their acridity; and when eaten, it is probably without intention, or perhaps as a condiment, like salt and pepper by mankind. Dried along with grass, they lose their pungent juices, and become a useful component of the hay.

The fruits of this species ripen abundantly, forming small brownish-black heads, which fall apart when touched, and well illustrate the nature of "achenia." They are to be looked for in September, in old pastures, where the cattle have not cared to eat the stems.

10. Creeping Buttercup—(*Ranúnculus répens.*)

Everywhere by way-sides and in fields, and a common garden weed. Fl. June—August.

Curtis, ii. 258; E. B. viii. 516.

Remarkable among buttercups for an almost total absence of acridity, and resembling, in this respect, the aquatic crowfoots.

11. Round-rooted Buttercup—(*Ranúnculus bulbósus.*)

Everywhere in meadows and pastures; the first of the three common field buttercups to open its flowers, and lingering to the very end of the year. Gathered in the midst of ice, December, 1840.

Curtis, i. 38; E. B. viii. 515.

12. Hairy Buttercup—(*Ranúnculus hirsútus.*)

Rare. Occasionally found near Leigh, Eccles, and Belle Vue. Fl. June—October. Annual.

Curtis, i. 113; E. B. xxi. 1504.

13. Cornfield Crowfoot—(*Ranúnculus arvénsis.*)

Occasionally in cornfields at Hough-end, Chorlton, Withington, Marple, Astley, Tyldesley, and Worsley, but very unstable. Fl. June. Annual.

Curtis, ii. 400; E. B. ii. 135.

Well marked by its large and prickly fruits.

14. Small-flowered Crowfoot—(*Ranúnculus parviflórus.*)

Near Garratt Hall, Tyldesley (J. E.); Eccles (J. S.) Fl. May, June. Annual.

E. B. ii. 120.

15. Celery-leaved Crowfoot—(*Ranúnculus sceleratus.*)

Frequent in ditches, and by stagnant and dirty water. Bowdon, Stretford, Eccles. Fl. June, July. Annual.

Curtis, i. 115; E. B. x. 681.

16. Pile-wort—(*Ficária vérna.*)

One of the earliest heralds of spring, abounding everywhere on hedgebanks and in woods, and thriving especially in rookeries.

Curtis, i. 112 (as *Ranúnculus Ficária*); E. B. ix. 584.

A flower easily recognised by its narrow and shining petals, which seem as if polished by art. They close before rain and at night, and curl backwards and turn white when overblown. A double-flowered variety is found in gardens.

17. Marsh Marigold—(*Cáltha palústris.*)

Illuminates the borders of every pond and marsh, in April and May, with broad masses of golden bloom, every blossom the size of a half-crown.

Curtis, i. 40; E. B. viii. 506; Baxter, ii. 153.

Common in gardens, with the flowers doubled, but much inferior in beauty to their wild state, the petals being narrow and small.

18. Globe-flower—(*Tróllius Europæus.*)

Moist woods and pastures in the hilly districts, but rather rare. Thornham and Pilsworth, both near Middleton. Also near Bolton, Mossley and Stalybridge. (J. P.) Fl. May, June.

E. B. i. 28; Baxter iv. 241.

Very common in gardens.

19. Columbine—(*Aquilégia vulgáris.*)

Rare. Pastures and hedgebanks about Baguley and Cotterill, sparingly. On the Buxton road, near Whaley Bridge. Hedges between Marple Wood and the River Goyt, plentiful. Right bank of the Mersey, below Northen. Fl. June, July.

E. B. v. 297; Baxter, iii. 221.

Very common in gardens, in many different colours, and usually double.

Besides the species named above, there are commonly cultivated in gardens about fifty others of this family, which contributes perhaps more than any other to their ornament. The Christmas-rose, or *Helléborus níger*, opens its large white cups with the new year, a beautiful example of the promotion of calyx, and the subordination of the corolla; the green-frilled *Eránthis*, or winter-aconite, a flower not unlike the pilewort, and the hepaticas, white, blue, and pink, the latter resembling tiny roses, arrive in March; then come the gorgeous, velvety, many-hued anemones, remarkable for the deep purple, amounting almost to blackness, of their innumerable stamens and pistils, and the pasque-flower, clothed in every part, including the dull violet and seldom-opened blossoms, with white and silky hairs. A few gardens can shew the charming blue *Anémone Apennína.* (Curtis, ii. 399.) May brings the scarlet Ranunculus, the *Tróllius Asiáticus*, and

the bachelor's-buttons, or *Ranúnculus aconitifolius*, with fan-lobed, angular leaves, and abundance of small white double flowers, in spreading corymbs. As the days lengthen, the superb pæonies begin to blow,—the finest examples of the Ranunculaceæ; and after these, the larkspurs, irregular-flowered, and mostly deep blue, including the native species, or *Delphínium consólida*. (E. B. xxvi. 1839.) Lastly come the yellow *Aconítum Lycóctonum*, various kinds of *Thalíctrum*, and the *Clématis*, that beautiful natural bower of white and green, which, in the sweet perfume it mingles with the breath of autumn, compensates the general scentlessness of the family. The large purple-flowered species with ternate leaves, is the *C. viticélla*. The *C. vitálba* or travellers' joy, (Curtis, ii. 257.) indigenous in the southern counties, occurs in gardens in Victoria Park, about Lymm, and at Leigh. There is a semi-wild plant of it in a stone-quarry near Boothstown, called Hampson Delph.

The poisonous hellebores, with the exception of the "Christmas-rose," or *Helléborus niger*, are fortunately less ornamental in their flowers, and, in consequence, not frequent. The commonest, next to the *Helléborus niger*, is the *Helléborus fœtidus*, a low-growing, ill-favoured plant, with large palmate leaves of disagreeable smell, and drooping panicles of globular green flowers, purple at the edges, and opening early in the spring.

It is in the garden species of this family that we have the best examples of the fruit called the "follicle," that is to say, a dry, upright, one-celled seed-pod, opening lengthwise along the inner side. The marsh-marigold supplies a very good illustration, but is surpassed by the columbine, the larkspur, and the pæony, which is the largest and finest of all. Here also occur the finest examples of tailed achenia, including, besides the clematis, the pasque-flower or *Anémone Pulsatilla*. (Curtis, iii. 502.)

III.—THE ST. JOHN'S-WORT FAMILY. *Hypericáceæ.*

Herbaceous or half-shrubby plants, with simple, usually opposite, undivided leaves, in outline generally oval or oblong. Flowers yellow, except in one or two foreign species, which have red blossoms; sepals and petals five each, two of the former outside the other three, and the petals often with unequal and black-spotted edges; stamens numerous, often one or two hundred, on long and slender filaments, united at the base into three or five clusters; ovary single, large, and oval; styles long, three in the wild Manchester species, five in some of the others. The leaves frequently appear full of minute holes when looked at against the light.

A family of 270 species, widely dispersed over the world, neat and often shewy in their flowers, but of no particular value economically.

Ten grow wild in England; seven in the neighbourhood of Manchester.

A.—Sepals broad and round; stem shrubby, two to three feet high; leaves egg-shaped, sessile; flowers in terminal cymes ..... 1. TUTSAN.

B.—Sepals small and narrow.

- Whole plant very woolly; stems procumbent, six to nine inches long; leaves circular; flowers few and pale ..... 2. MARSH ST. JOHN'S-WORT.
- Plant not woolly.
  - Stems trailing, six to twelve inches long; leaves elliptical; flowers few and far apart ..... 3. TRAILING ST. JOHN'S-WORT.
  - Stems upright, one to two feet high; flowers numerous, in panicles.
    - Stem more or less four-sided; leaves egg-shaped.
      - Leaves with transparent dots; stem acutely four-cornered .. 4. SQUARE-STALKED ST. JOHN'S-WORT.
      - Leaves without transparent dots; stem bluntly four-cornered .. 5. IMPERFORATE ST. JOHN'S-WORT.
    - Stem round, or nearly so.
      - Leaves elliptical, ovate, obtuse, with transparent dots ..... 6. COMMON ST. JOHN'S-WORT.
      - Leaves broadly heart-shaped, amplexicaulent; petals tipped with red ..... 7. PRETTY ST. JOHN'S-WORT.

THE ST. JOHN'S-WORT FAMILY.

HABITATS AND LOCALITIES.

1. TUTSAN—(*Hypéricum Androsæmum.*)

Bredbury Wood; Bamford Wood, on rocks, almost at fox-and-grapes height; in shrubby places near Styall; and plentiful on hedgebanks about Boothstown, Chaddock Hall, and Ellenbrook. (J. E.)

Curtis, i. 193; E. B. xviii. 1225; Baxter, i. 39.

A very common ornament of gardens and the edges of plantations.

2. MARSH ST. JOHN'S-WORT—(*Hypéricum Elódes.*)

Rare. Lindow Common, near Wilmslow; Eaton Moss, near Congleton; Brookhouse Moss, near Macclesfield; and plentiful in boggy places at Greenfield. Fl. July, August.

E. B. ii. 109.

Eaton Moss and Brookhouse Moss are beyond the limits of our Flora, but the rarity of the plant permits their citation.

3. TRAILING ST. JOHN'S-WORT—(*Hypéricum humifúsum.*)

Dry, sandy, and gravelly banks, generally under the protection of larger and stouter plants. Plentiful on Hale Moss. Fl. July, August.

Curtis, i. 195; E. B. xviii. 1226.

4. SQUARE-STALKED ST. JOHN'S-WORT—(*Hypéricum quadrángulum.*)

Common in moist and marshy places. Hale Moss. Plentiful about Baguley, Sale, and Bowdon. Fl. July, August.

Curtis ii. 272; E. B. vi. 370.

5. IMPERFORATE ST. JOHN'S-WORT—(*Hypéricum dúbium.*)

Not uncommon on dry hedgebanks, and in copses, especially in the district lying due south, a part of the country rife with curious wild-flowers. Fl. July, August.

E. B. v. 296.

6. COMMON ST. JOHN'S-WORT—(*Hypéricum perforátum.*)

Copses, dry hedgebanks, and rough places, abundant. Fl. July, August.

Curtis, i. 57; E. B. v. 295; Baxter, i. 80.

7. Pretty St. John's-wort—(*Hypéricum púlchrum.*)

Frequent by waysides, and on sandy hedgebanks that look sunwards. Plentiful about Baguley. Fl. July, August.

Curtis, i. 56; E. B. xviii. 1227.

One of the most elegant of our wild-flowers, recognised immediately, among the St. John's-worts, by its slender stems, pairs of heart-shaped, sessile leaves, red anthers, and red-tipped flower-buds.

A solitary plant of the *Hypéricum hirsútum* was gathered some years ago on the banks of the Irwell, not far from Agecroft bridge. (J. P.)

The "Rose of Sharon," a low-growing shrubby plant, with large oval leaves, yellow flowers, two or three inches across, the petals often lobed, five pistils, and stamens innumerable,—a frequent ornament of shrubberies, and blossoming all summer, is the *Hypéricum calycínum*, reputed wild in some parts of England. (E. B. xxix. 2017.) The *Hypéricum Coris* and *Hypéricum Balearicum* are also found in gardens, but rarely.

IV.—THE CAMELLIA FAMILY. *Ternstrómiáceæ.*

Beautiful trees and shrubs, Chinese in their most interesting species, but natives principally of the woods of South America. The Asiatic species include the tea-tree or *Théa viridis*, and the lovely and well-known flower which gives name to the family, and which is the only member of it in ordinary cultivation. The glory of every green-house in early spring, the camellia seems made purposely for evening parties, and ladies' hair and bosoms. The largest and most flourishing and diversified collection of these incomparable flowers, as regards the neighbourhood of Manchester, is that of R. S. Yates, Esq., whose green-houses at Timperley present quite a sea of leaf and bloom.

V.—THE POPPY FAMILY. *Papaveráceæ.*

Herbaceous plants, usually of nauseous odour, with simple, alternate, often much-divided leaves, and the juice of the stem frequently orange-coloured, red, or milky-white. Sepals two, falling when the

flower expands; petals four, white, red, or yellow, never blue, often with a dark spot at the base, generally large and shewy, and often crumpled; stamens thirty to two or three hundred. Ovary single, either one-celled, and ripening into a long and slender pod; or of many cells, in which latter case the stigmas radiate upon the summit, like those of water-lilies, and the fruit is capsular, and urn-shaped or globular. Deducting the genuine poppies, which shew the many-celled capsule to perfection, the pod-like fruit is the predominant one among the species commonly met with. Figs. 88 and 89 represent the former, in the one case ripe, with the peculiar openings just under the roof, by which the seeds escape, reminding us of the nests of swallows under the eaves; and in the other immature, and cut in two, so as to shew the carpels and ovules. In the ripe state, the symmetry and true character of the carpels is obscured, as they then appear only as walls, projecting from the margin towards the centre, which is vacant.

Fig. 87.
Flower of Celandine.

Fig. 88.
Unripe poppy capsule, cut in two.

Fig. 89.
Ripe poppy capsule.

Every one knows the character of the Lethean poppy, the source of opium, laudanum, and morphia; the same is the character of the family in general, *i. e.*, narcotic and dangerous, the oil of the seeds of the opium-poppy being the only example to the contrary. Some species, as the celandine, are acrid and violently poisonous. Of 180 that are known, two-thirds belong to Europe, and the remainder are scattered indiscriminately over the globe.

Ten species grow wild in England, and five of them near Manchester.

A.—Flowers yellow, in long-stalked umbels; leaves large, pinnatifid, with broadly ovate segments; juice of the stem orange-coloured. Seed-pod long and slender (Fig. 87) ..... 1. CELANDINE.

B.—Flowers white, with a purple spot at the base; plant smooth and glaucous. Leaves undivided, toothed, and stem-clasping. Capsule nearly globular, smooth ..... 2. OPIUM POPPY.

C.—Flowers red; plant hairy; leaves pinnatifid and cut.

- Petals oblong, narrow, distinct, pale red; pollen blue; capsule hairy, club-shaped, and ribbed ..... 3. PALE-RED POPPY.
- Petals round, their edges lapping over a little; pollen yellow; capsule smooth.
  - Bristles of the flower-stalk appressed; capsule abruptly oblong, angular. Petals pale-red ..... 4. LONG-HEADED POPPY.
  - Bristles of the flower-stalk spreading; capsule half-globular. Petals rich scarlet ..... 5. SCARLET CORN-POPPY.

THE POPPY FAMILY.

HABITATS AND LOCALITIES.

1. Celandine—(*Chelidónium május.*)

Hedges and waste places, always among other plants, and generally near houses, looking like a garden outcast. Eccles, Alderley, Baguley, Ashton-upon-Mersey, Bowdon, &c., common. Fl. June, July.

E. B. xxii. 1581; Baxter i. 51.

2. Opium Poppy—(*Papáver somníferum.*)

Occasionally in waste ground, but always as an escape from cultivation, more or less remote, being originally from Asia, and in Europe only naturalized. Fl. July, August. Annual.

E. B. xxx. 2145; Baxter, i. 53.

3. Pale-red Poppy—(*Papáver Argemóne.*)

In cornfields, common. Chorlton, Withington, Sale, Bowdon, Prestwich. Fl. June, July. Annual.

Curtis, ii. 330; E. B. ix. 643.

The flowers are almost as fugitive as those of the Cistus, rarely enduring above six hours.

4. Long-headed Poppy—(*Papáver dúbium.*)

Cornfields, common. Fl. June, July. Annual.

Curtis, ii. 329; E. B. ix. 644.

5. Scarlet Corn-poppy—(*Papáver Rhœas.*)

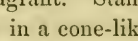
Rare. Occasionally in cornfields about Prestwich, Bowdon, and Sale. Plentiful near Sale Station in 1858. Fl. June, July. Annual.

Curtis, i. 177; E. B. ix. 645.

Poppies are remarkable alike for their fecundity, and for the suddenness with which they appear and vanish when left to themselves. The seeds vegetate with freedom only where the soil has been recently turned over; and if a field or garden in which they have been scattered is laid down to grass, or is in any way hardened and compacted, they seem to lose the power of growth, the plant disappearing almost entirely. Possessed, however, of uncommon tenacity of life, directly the ground is disturbed anew, no matter how distant the interval, the latent energy comes forth, and poppies are again in the ascendant. The surfaces of railway cuttings have in many instances been ornamented, the first season, with the scarlet of the *Papáver Rhœas*, the seeds of which must have been lying in the earth for ages. This species is distinguished among our wild ones by the remarkably rich and satiny gloss of its flaunting petals.

The garden species of Papaveraceæ, after the gaudy and offensive true poppies, which comprehend numerous varieties of the *Papáver somníferum*, the *Papáver Rhœas*, the *Papáver Orientále*, and the *Papáver bracteátum*, though pretty numerous as a list, are very little in demand for general culture. The only common one is the well-known annual with dazzling crocus-coloured flowers, weak decumbent stems, and finely-divided leaves, called *Chryseis* or *Eschscholtzia Califórnica*. The calyx in this plant is pushed off by the expanding petals in the shape of a candle extinguisher. The others are the yellow poppy-face or *Meconópsis Cámbrica*, (E. B. i. 66.) resembling a poppy except in colour; the horned-poppies, which are different species of *Glaúcium;* the *Sanguinária* or blood-root, so called from the resemblance of the root, when cut across, to a bleeding wound, an elegant little white-flowered plant; the bane-berry or *Actæa;* (E. B. xiii. 918.) another pretty Californian, with lanceolate leaves, and flowers of a delicate cream colour, called *Platystémon;* and a very curious little annual called *Hypécoum procumbens*. The common yellow horned-poppy, or *Glaucium lúteum*, is admirably figured in Curtis (iii. 49!), being a plant indigenous to our sea-coasts.

VI.—THE MAGNOLIA FAMILY. *Magnoliáceæ.*

Noble and richly-foliaged trees of the East Indies and the warmer parts of North America. Leaves large, alternate, simple, perfectly smooth, and with their stipules curled inwards and covering the buds. Flowers several inches across, solitary, strikingly beautiful, white, purple, or orange-coloured, and generally fragrant. Stamens 50 to 100; ovaries equally numerous, and piled up in a cone-like manner. The tulip-tree or *Liriodéndron*, immediately known by its singular leaves, which are as large as the palm of the hand, square at the top, and with the lower edge in two elegant curves, like a bracket,  , occurs in every well-planted pleasure-ground; and in the Botanic Gardens is accompanied by two or three species of Magnolia, with oval leaves, and white or purple corollas. Economically the family is bitter, tonic, and aromatic, and in many cases useful for timber.

VII.—THE TOUCH-ME-NOT FAMILY. *Balsamineæ.*

Herbaceous plants, from one to three feet high, the stems swollen at the joints, and often succulent with watery juice. Leaves simple, petiolate, undivided, oblong, ovate, or lanceolate, toothed, and usually

flaccid. Flowers extremely irregular, and often curiously twisted; in structure and affinities pentamerous, but of only six distinguishable pieces. Stamens five, the filaments thick and short, and the anthers cohering in a ring round the five minute and sessile stigmas. Which of the six pieces are calyx, and which are to be considered petals, and how much of the flower is wanting or imperfect, is matter of dispute. The most reasonable view is that one only of the ten theoretical pieces is really deficient, the calyx being composed of the spur, the pair of lateral bract-like leaves, and the large posterior leaf, the latter consisting of two sepals united by their edges; while the two inner leaves are in reality four, united like the others, by their edges, and constituting a genuine, though abnormal, corolla. The fruit of the Touch-me-nots is generally a capsule formed of five elastic valves. As soon as ripe, especially if touched, the valves suddenly separate from one another, rolling inwards like a frightened hedge-hog, and by the rapidity of the movement, leaping to a long distance from the plant, the large brown seeds being dropped upon the way. The peculiarity in question is sufficient, in connection with the irregular flowers, to characterise the family.

India and the adjacent archipelago are the chief abodes of the Touch-me-nots, a few belonging to the temperate parts of Europe and North America. They are conspicuous for their eccentric beauty, but of little discovered use, though the name "Balsam" might lead to the supposition that they are generous and aromatic. The balsam-yielding plants are trees, and constitute an entirely different family.

Two species intermingle with the wild-flowers of England, and both are found near Manchester.

1. Stem and leaves as described above; peduncles axillary, slender, bearing about four large and showy yellow flowers, which expand one at a time, and last a very little while, the inside spotted with orange; the spur curved upwards, and then bent back ..... Yellow Touch-me-not.

2. Resembling the former, but with flowers of a deep orange colour, spotted with brown ..... Tawny Touch-me-not.

HABITATS AND LOCALITIES.

1. Yellow Touch-me-not—(*Impatiens Noli-me-tangere.*)

Abundant in a rocky ravine in Bamford Wood, where it has flourished for at least fifty years. Up to 1854 it grew plentifully opposite Bowdon new Church, but owing to the alterations of the

ground, is now lost there. (Mr. Hunt.) Formerly it also grew in plenty on Crumpsall Green. (J. P.) Fl. summer and autumn. Annual.

E. B. xiv. 937; Baxter, ii. 125.

2. Tawny Touch-me-not—(*Impátiens fúlva.*)

Woods and rough places about Marple Old Hall, abundant. (Mr. J. Sidebotham.) Fl. summer and autumn. Annual.

E. B., Supp. ii. 2794.

A colonist in reality, from North America. The facility with which the Touch-me-nots establish themselves where the seed is once scattered, will probably render them common plants in the course of time. Three or four Indian species are cultivated in green-houses, but in general only the *Balsámina horténsis*, the "Balsam" of the florist, an exceedingly elegant plant, with thick, semi-transparent stems, and profusion of variegated and usually double flowers, resembling small carnations. The *Impátiens coccínea*, a tall and weedy plant, with flowers of a dull red colour, is rapidly disseminating itself, growing, like its congeners, wherever a seed is dropped.

VIII.—THE GERANIUM FAMILY. *Geraniáceæ.*

Herbaceous or under-shrubby plants. Leaves simple, stipuled, on long stalks, usually fan-lobed, with the segments more or less deeply cleft, but in some cases pinnatifid, and often aromatic. Flowers simple, pentamerous, regular in the British species, often irregular in the exotics; the petals most frequently of some glowing shade of red, and richly streaked, laced with coloured veins, or parti-coloured; sometimes white or blue, and similarly pencilled. Stamens ten; the alternate ones, or three of them, sometimes imperfect; stigmas five, large, beautiful, coloured, and elegantly recurved; inflorescence in umbels, occasionally reduced to a couple of flowers, or even to a single one.

Geraniums are distinguished from all other plants by their fruit, which consists of five one-seeded carpels, greatly lengthened at the upper extremity, and leaning against a tall and slender pillar. When ripe, the carpels detach themselves from the pillar, commencing at the base, and gradually curving upwards and outwards till they just hang to the apex by their points, forming five elegant concave arms, each with a seed in the little cup at the extremity. Sometimes they twist spirally while separating, when the fine white hairs with which

they are often edged, as in the case of the common scarlet geranium, are converted into a circlet of silver rays. (See Figs. 90, 91, 92, 93.) If wetted, the spires uncurl, and become as straight as before they quitted the plant, resuming the ringlet form as they become dry again. This property they retain for many years,—a most curious and beautiful phenomenon for parlour amusement. The hairs probably act as little levers, helping to disengage the carpel from the pillar, and force it into the curve. Geraniums are further characterised by the numerous joints of their stems, the readiness with which they snap at those places, and the abundance of their bracts and stipules, which often remain after the leaves are gone.

Fig. 90.
Unripe Fruit of Geranium.

Fig. 91.
Carpel of Pelargonium.

Fig. 92.
Carpel of Erodium.

Fig. 93.
Ripe Fruit of Geranium.

The plants of this beautiful family fall into two divisions. The first comprises the true geraniums, irregular-flowered, shrubby, and often fragrant-leaved, the lovely gifts of the Cape of Good Hope, where they grow in profusion: secondly, there are the "Crane's-bills" and "Heron's-bills," principally inhabitants of the temperate parts of the northern hemisphere, and distinguished by their herbaceous habit of growth, their regular, and often inconspicuous blossoms, and the smell of the leaves, if any, being unpleasant, unless in the musky heron's-bill, or *Erodium moschatum*. The crane's-bills are distinguished by the tail of the carpel being simply curved; the heron's-bills by its being spirally twisted. The two latter genera alone have indigenous representatives in our island, fifteen occurring in all, and nine of them near Manchester.

In comparing specimens with the descriptions given in the chart, care should be taken to look at the lower or root-leaves, as the stem-leaves vary considerably, even upon the same plant.

A.—Flowers dark brownish-purple, almost black; stem erect, panicled; leaves fan-lobed and divided; carpels curved ..... 1. Dusky Crane's-bill.

B.—Flowers large, clustered, bright blue, with white and purple veins; leaves fan-lobed and divided; carpels curved ..... 2. Blue Meadow Crane's-bill.

C.—Flowers crimson or blueish rose-colour.

- Leaves fan-veined, and deeply divided into narrow lobes. Carpels curved.
  - Leaves with three deeply-cut lobes; petals veined, sometimes white; whole plant smelling disagreeably ..... 3. Herb-Robert.
  - Leaves roundish, with 5 or more deeply-cut lobes.
    - Peduncles shorter than the leaves.
      - Leaves divided to the middle.
        - Petals deeply notched; sepals obtuse; stamens all perfect. Plant downy all over. 4. Dove's-foot Crane's-bill.
        - Petals slightly notched; sepals pointed; five stamens abortive .. 5. Least Crane's-bill.
      - Leaves divided to the base ..... 6. Bashful Rose Crane's-bill.
    - Peduncles much longer than the leaves; sepals with long points ..... 7. Slender Crane's-bill.
- Leaves pinnate or pinnatifid; stems prostrate; 5 stamens abortive.—Carpels spirally twisted.
  - Leaflets deeply pinnatifid, with toothed lobes; flowers lilac, sometimes white ..... 8. Common Heron's-bill.
  - Leaflets egg-shaped, and coarsely toothed; flower bright purple; plant with a musky smell ..... 9. Musky Heron's-bill.

THE GERANIUM FAMILY.

HABITATS AND LOCALITIES.

1. Dusky Crane's-bill—(*Geránium phæum.*)

Rare; generally by waysides. Roadside between Bowdon and Rostherne (1857), between Mere and Knutsford, and near Mobberley. Fl. May, June.

E. B. v. 322 (coloured too red).

Often seen in gardens, from which, when seemingly wild, it is not improbably a castaway.

2. Blue Meadow Crane's-bill—(*Geránium praténse.*)

Meadows and thickets, chiefly where the soil is somewhat moist, and near rivers. Banks of the Irwell, between Agecroft and Clifton; banks of the Tame, plentiful; and abundant about Bowdon, Cheadle, Wilmslow, and Statham, near Lymm. Fl. June, July.

Curtis, ii. 269; E. B. vi. 404 (too red); Baxter, i. 30.

Next to the *sanguíneum*, the most showy of our English Crane's-bills, and as a wild-flower unsurpassed. The beautiful blue of the petals is retained in well-dried specimens almost indefinitely.

3. Herb-Robert—(*Geránium Robertiánum.*)

Hedgebanks, especially where rough and stony; on ruins; on natural rock-work, in shady places; in dead bodies of trees that have been cut down and are gone to decay; also on the thatched roofs of old cottages, and in the chinks of their crumbling walls, holding on by a mere thread. Fl. all summer. Annual.

Curtis, i. 52; E. B. xxi. 1486.

A curious and independent plant, commending itself wherever met with by the bright rose-hue of its pretty white-streaked blossoms; the lightness and elegance of its branches and foliage, which toward the close of autumn often turn to a vivid red, and by the long continuance of its cheerful flowers, which last from before midsummer to November. Unfortunately it has a strong and to most people, disagreeable odour, resembling that of foxes. Once in the season or so it may be found with the flowers of a pure white.

4. Dove's-foot Crane's-bill—(*Geránium mólle.*)

Common everywhere by waysides and in cultivated fields, especially among clover. Fl. spring—autumn.

Curtis, i. 123; E. B. xi. 778.

A plant of little pretension in its earlier summer life, but waxing luxuriant as the apples ripen, and by October really beautiful.

5. Least Crane's-bill—(*Geránium pusíllum.*)

In fields about Chorlton and Ashton-upon-Mersey. Fl. June—September. Annual.

Curtis, ii. 410: E. B. vi. 385.

Resembling *G. mólle* in habit, but smaller.

6. Bashful Rose Crane's-bill—(*Geránium dissèctum.*)

Common in newly broken fields, where the soil is light, by waysides, and on hedgebanks, flowering, like its congeners, from May to the close of autumn. Annual.

Curtis, ii. 409; E. B. xi. 753.

Well distinguished by the deeply-divided leaves, which are hairy, not downy, and the very short stalks of the brilliant but timid flowers, which sit half-concealed amid the upper foliage.

7. Slender Crane's-bill—(*Geránium columbínum.*)

Hedgebanks, rather rare. Oftenest seen in the district lying south, as at Chorlton, Bowdon, and Cotterill. Fl. June—September. Annual.

E. B. iv. 259.

The very opposite of the preceding in respect of its flower-stalks, which are frequently three or four inches long. Pollen, *blue.*

8. Common Heron's-bill—(*Erodium cicutárium.*)

In cultivated fields and by dry waysides, but not a common plant. Plentiful about Bowdon. Fl. all summer. Annual.

Curtis, i. 51 (as *Geránium cicutárium*); E. B. xxv. 1768.

9. Musky Heron's-bill—(*Erodium moschátum.*)

Chaddock Lane; Wood-end, Tyldesley; and near the Swinton Schools, plentiful some years ago, but now rather scarce. (J. S.) Fl. June, July. Annual.

E. B. xiii. 902; Baxter, v. 362.

The geraniums which so deliciously scent our green-houses with their warm aroma, are botanically called *Pelargóniums.* They are mostly the results of ingenious culture, no plants owing more to the skill of the gardener, and are varieties chiefly of the *P. speciósum* and the *P. cucullátum.* The old-fashioned scarlets, with narrow petals, and flowers in dense umbels, and which thrive so well in the open borders, along with verbenas and other ornaments of the autumn, comprise the *P. inquinans*, with the foliage of a plain green, and the

P. zonále, or "horse-shoe," distinguished by the broad, purple, arch-like band upon every leaf. The beautiful pale-green, slender-stemmed species, well named the "ivy-leaved," is the *P. peltátum*, and the little lemon-scented geranium, with pinnatifid leaves, the *P. quercifólium*. The cuticle of the geranium petal, when put in water, and moderately magnified, is one of the richest microscopic objects that flowers afford.

The favourite hardy species are the indigenous *G. sanguíneum* or "crimson crane's-bill," (Curtis, iv. 633.) with large, round, flat, deep-hued flowers, solitary on the peduncles, an exceedingly handsome plant, flowering from July to October; the *G. Lancastriénse*, or "Lancashire crane's-bill," a charming variety of the *sanguíneum*, the petals flesh-coloured and laced with red, and taking its name from the Isle of Walney, beyond Morecambe Bay, which was once esteemed its native place; the *G. striátum*, or pencilled geranium, resembling the *Lancastriense* in the veining of its petals, but larger in growth, and with smaller blossoms; and lastly, the Iberian, or *G. Ibéricum*, closely resembling the indigenous *G. praténse*, but with the leaves less divided. The *G. lúcidum* (Curtis, iii 514.) and a few others occur in curious gardens, but only the four first-named are very general.

IX.—THE FLAX FAMILY. *Linácea.*

Herbaceous or undershrubby plants, the common species delicate and slim. Leaves small, simple, entire, usually narrow, and always without stipules. Flowers regular, of three, four, or five extremely fugitive petals, usually blue or white, occasionally red or yellow. Sepals and stamens corresponding in number with the petals; styles several, and distinct; stigmas capitate; capsule nearly globular, separating into as many pieces as there are styles, without leaving a central pillar, and containing two flat and inverted seeds in each compartment.

Europe and the North of Africa are the principal stations of this family, which is scattered, however, nearly all over the globe. The tenacity of the fibres of the stems, exhibited in linen and the finer descriptions of string; and the mucilaginous character of the seeds, familiar in the domestic applications of linseed, which is the produce of the same plant that yields the flax of the weaver, and which supplies also the linseed oil of commerce, render the principal species highly interesting and important, while a few others are useful in medicine, as bitters.

Five grow wild, or have become naturalized in England, and three of them near Manchester.

A. Parts of the flower in fives.

1. Flowers large, purplish-blue. Stems one to three feet high, corymbose at the upper part; leaves alternate, narrow lanceolate .... } COMMON FLAX.

2. Flowers small, pure white, pendulous while in bud. Stems six to eight inches high, forked at the upper part; leaves opposite, oblong or oval ..... } PURGING FLAX.

B. Parts of the flower in fours.

3. A minute plant, seldom more than one or two inches high, with dichotomous branches; egg-shaped, opposite, sessile leaves; and white, axillary flowers ... . } ALL-SEED.

HABITATS AND LOCALITIES.

1. COMMON FLAX—(*Linum usitatissimum.*)

Occurs in fields, among corn and other crops; the seeds, like those of the opium poppy, originally let fall by man. Fl. July. Annual.

Curtis, ii. 314; E. B. xix. 1357; Baxter, v. 353.

2. PURGING FLAX—(*Linum cathárticum.*)

Common in dry fields, and especially fond of green declivities of pastoral hills. Plentiful about Bowdon and Tyldesley. Fl. July, August. Annual.

Curtis, i. 164; E. B. vi. 382.

3. ALL-SEED—(*Radiola millegrána.*)

Abundant on Lindow Common, Amberswood Common, and Knutsford race-ground. Fl. July, August. Annual.

E. B. xiii. 893; Baxter, iii. 188.

X.—THE WOOD-SORREL FAMILY. *Oxalideæ.*

Half of this family consists of shrubs and trees, belonging exclusively to the hotter regions of the world; the remainder are delicate and pretty little herbaceous plants, natives of temperate and northern latitudes. Our present concern is with the latter, or true wood-sorrels. Seldom rising more than a few inches above the ground, these elegant little plants are known by their trifoliolate leaves, in flavour agreeably acid, the leaflets very changeable in position, owing to their sensitiveness to variations in the atmosphere; and by their regular and pentamerous flowers, white, yellow, or pink, completely opening only in sunshine,

with ten stamens, the five inner ones longer than the five outer, and five pistils, corresponding with the cells of the ovary. The latter becomes a five-angled capsule, each of the five cells provided with a curious elastic lining, which inverts itself as soon as ripe, or if gently squeezed between the fingers, like a pocket turned inside out, and darts out the seed to a distance of twenty inches.

Two species are indigenous, and both belong to the Flora of Manchester.

1. Flowers solitary, white, with purple veins, the peduncles and the leaves both from the root, which is red and beaded .... } Common Wood-sorrel.
2. Flowers pale yellow, in umbels of two to four or five; peduncles axillary; stem branched and bearing leaves ..... } Yellow Wood-sorrel.

HABITATS AND LOCALITIES.

1. Common Wood-sorrel—(*Oxalis Acetosélla.*)

Few are the groves and shady banks where the pencilled blossoms of this dainty little plant may not be found, like silver bells among the moss, companions of the primrose and scentless violet, and succeeding the anemones and the pilewort. The leaves, which are of a most beautiful bright-green, and often purple underneath, are scarcely in perfection till a little later in the season. A rich pink variety has been gathered in Ashworth Wood and Cotterill Clough, and probably occurs somewhere every year, among the crowd of blossoms "born to blush unseen." Up to last year it grew abundantly on a bank sloping to the north, near the Eccles Railway Station, but the alterations of the road have now nearly effaced it. (J. S.)

Curtis, i. 104; E. B. xi. 762; Baxter, v. 327.

Over and above the singular beauty of the little fairy, it is interesting from its near approach to the nature of sensitive plants. All the Oxalideæ have a tendency this way, opening and closing their leaves with the changes of the atmosphere, and the alternations of light and darkness, and some are even sensitive to the touch. The *Acetosélla* agrees with them in its deference to moisture and sunshine, refusing only to make obeisance to the finger. The mode in which the leaflets fold together is remarkable. While in pinnate leaves that close and open, the leaflets draw together face to face; here, as in the digitate leaf of the lupine, which is like a wood-sorrel leaf on a great scale, they bend backwards and downwards, and form a pyramid, the summit of the petiole becoming the apex. The wood-sorrel is the badge of the sister country,—

Chosen leaf
Of bard and chief,
Old Erin's native Shamrock

2. Yellow Wood-sorrel—(*Oxalis corniculáta.*)

Abundant as a weed in the garden at Broomcroft House, Didsbury; also in the garden, unsown, at Rose Hill, Northen, the residence of Absalom Watkin, Esq.; and in cultivated ground at Rusholme and Baguley. Fl. June.

E. B. xxiv. 1726.

The cultivated Oxalideæ comprise a few from the Cape of Good Hope, closely resembling the English species, but larger and more succulent, and a charming plant called *Biophytum*, which lifts a rosette of pinnate and sensitive leaves upon the summit of a little column,—a palm, or tree-fern, as it were, in miniature. They are seldom seen out of the green-house.

XI.—THE TROPHY-WORT FAMILY. *Tropæóleæ.*

Herbaceous plants, with slender and succulent stems, scrambling among stouter ones for support. Leaves alternate, simple, lobed or undivided, on long petioles, which are often bent into hooks shaped like the letter S, and used as tendrils. Flowers irregular, on long peduncles, very shewy, red, scarlet, or yellow, sometimes with green superadded. Calyx with a long hollow tail; petals five; stamens eight; carpels three, distinct, forming a three-cornered ovary and fruit, and falling apart when ripe.

Natives, to the extent of about forty species, of the temperate parts of North and South America; in properties pungent, acrid, and strong-smelling, as well known in the common garden "Nasturtium," or *Tropæolum május*, the English name being in reality the Latin or botanical one of the water-cress, which the plant is considered to resemble in flavour. The name "Tropæolum" is given to it by reason of the shield-shaped leaves, presented full front, and dark ensanguined flowers, which so aptly image the blood-stained "trophy," helmets, armour, and weapons, of the ancient battle-field. The light and graceful Canary-bird plant, or *Tropæolum Canariénse*, so pretty for a trellis, belongs to the same genus. In green-houses occur *T. tricolorum*, *T. pentaphyllum*, and several others. The extent to which most of the hardy kinds will spread in the course of the summer and autumn is really wonderful, and equally so the resistance of their leaves to wet. Rain has no power to moisten even their surface, rolling off as fast as it falls, in silvery globules.

XII.—THE MALLOW FAMILY. *Malvaceæ.*

One of the great patrician families of the earth, comprising trees, shrubs and herbs, of the comeliest make and aspect, and of the highest worth to man. Leaves simple, alternate, fan-veined, petioled and stipuled, and more or less divided into lobes. Flowers shewy, axillary, regular, with five petals, five sepals, and frequently an outer calyx of three more. Stamens numerous, with long filaments that are gradually shorter outwards, the whole united lengthwise into a tube or cylinder, which encloses the ovaries and styles, leaving only the stigmas exposed to view. The anthers form a tuft immediately underneath, presenting, with the cylinder, the image of a little tree, strikingly characteristic of the family. The fruit, in all the British, and most of the hardy cultivated species, consists of thin, one-seeded achenia, arranged edgeways in a whorl round the base of the styles, and forming a thick, flat mass, the shape of a cheese. The pollen, which is globular, and covered with spinous projections, forms a very interesting object for the microscope.

Fig. 94.
Section of Mallow flower.

Fig. 95.
Flower of Mallow.

This fine tribe of plants, numbering about 1,000 known species, has its chief seat in the tropics, where it is arborescent, and continues plentiful in the hotter parts of temperate countries, but gradually diminishes towards the north, and is faintly represented in the end by a few weeds of the wayside. It abounds universally with mucilage, and is not in a single instance deleterious. Several species are of use to the physician; others furnish fibres suitable for the manufacture of cloth and cordage, and different kinds of *Gossypium*, the cotton that has made so many thousands in Manchester rich and powerful.

Six species grow wild in England, and three of them near Manchester.

A.

Stems erect and stiff, two to three feet high; petals three or four times as long as the calyx; flowers conspicuous.

1. Flowers rose-coloured, crowded at the summits of the branches; stem-leaves deeply divided into linear and pinnatifid lobes..... } Musk Mallow.

2. Flowers purple, streaked with violet, in axillary clusters; stem-leaves with short broad lobes, not reaching to the middle ..... } Violet Mallow.

B.

3. Stems weak and reclining; flowers insignificant, in axillary clusters; petals pale-blueish, not more than twice as long as the calyx.... } Dwarf Mallow.

HABITATS AND LOCALITIES.

1. Musk Mallow—(*Málva moscháta.*)

Hedgebanks, but very thinly scattered. Roadside by Cotterill Clough, fine and plentiful; Rostherne; Prestwich; Pendlebury; Tyldesley; and plentiful at the edge of Botany Bay Wood. (J. E.) Fl. July, August.

Curtis, ii. 270; E. B. xi. 754; Baxter, i. 25.

The petals are of a singularly delicate texture, and when dried, are a mere film. A white variety is common in gardens, and occasionally appears in the wild state.

2. Violet Mallow—(*Málva sylvéstris.*)

Plentiful in Chaddock Lane, and at Shakerley, both near Tyldesley, and at Tyldesley Fold, Atherton. (J. E.; G. H.) Occasionally seen, poor and ill-developed, in dry places about Bowdon, and once found in Didsbury churchyard. Fl. July, August.

Curtis, i. 124; E. B. x. 671 (coloured too red).

3. Dwarf Mallow—(*Málva rotundifólia.*)

Occasionally found in lanes at Bowdon, and at Tyldesley. (J. E.) Fl. June—September.

Curtis, i. 188; E. B. xvi. 1092.

The tall and stately spires of the hollyhock (*Althæa rosea*), with flowers like roses, yellow, white, claret-colour or pink, the calyx double, and covered with soft hairs, give an exceedingly good idea of the noble character of the exotic malvaceous plants. Their beauty is further illustrated in the green-house genera *Hibiscus*, *Achánia*, and *Abútilon*, one species of which latter, the *A. striatum*, is tolerably common, bearing abundance of pendulous oval bells, on peduncles three inches long, the petals deep yellow, and laced with vermilion. Several pretty *Málvas* are also frequent in flower-gardens and conservatories.

XIII.—THE LIME-TREE FAMILY. *Tiliaceæ.*

Handsome trees, of northern latitudes, with simple, roundish, serrated, pointed, alternate, and petioled leaves, the blade often larger upon one side of the midrib than upon the other. (Fig. 97.) Flowers small, buff-coloured or yellowish, borne in little clusters upon the front of a winged stalk. (Fig. 96.) Sepals and petals each five; stamens about twenty; ovary single. Fruit a small, dry, brownish nut, the size of a pea. There are many species exceptional to the above description, some even herbaceous, but chiefly tropical, and none of them in common cultivation. In England indeed we scarcely know the family except through the medium of the true limes, and these may be distinguished from all our other forest trees by the little tufts of hair in the angles of the principal veins, upon the under side of the leaf. Lime-trees are remarkable for the toughness of their inner bark, which is extensively used as string by gardeners, under the name of "bass," and in Russia, for making mats.

Fig. 96.
Flower of Lime-tree.

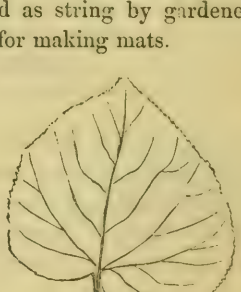


Fig. 97.
Leaf of Lime-tree (half-size).

Three species occur apparently wild in England, but only one of them, the *Tilia parvifolia*, or small-leaved lime, has genuine claims to be considered an "ancient Briton." The others alone are found near Manchester.

1. Leaves smooth on both sides; flowers three to six in a cluster ..... } Common Lime-tree.

2. Leaves smooth upon the upper surface, downy upon the under; young shoots hairy; flowers one to three in a cluster; fruit prominently ribbed ..... } Broad-leaved Lime-tree.

HABITATS AND LOCALITIES.

1. Common Lime-tree—(*Tilia Europæa.*)

Planted abundantly in parks and pleasure-grounds, and very beautiful as an avenue or lawn tree. Fenelon makes it one of the ornaments of the enchanted island of Calypso. The flowers, which appear in July, are delightfully fragrant, and allure the bees in legions.

Curtis, iv. 620; E. B. ix. 610; Baxter, iv. 293.

2. Broad-leaved Lime-tree—(*Tilia grandifolia.*)

On the slope of the hill at Prestwich Wood, and near Ashton-upon-Mersey church. Fl. June, July.

E. B., Supp. ii. 2720.

XIV.—THE CISTUS FAMILY. *Cistáceæ.*

Upright and shrubby for the most part, sometimes prostrate on the ground, with wire-like, but woody stems. Leaves simple, entire, never dotted, as in the St. John's-worts (which in several respects these plants resemble); flowers regular, usually of great beauty, white, yellow, or reddish, and very fleeting; sepals three, equal, generally with two small additional ones outside; petals five, crumpled; stamens numerous, their filaments free at the base; pistil single.

Cistuses belong almost exclusively to the countries and islands bathed by the Mediterranean, and number about 200 species. A few are resinous and balsamic, as the delicious gum-cistus or *C. Cyprius*, the loveliest of the family, the large white crumpled petals of which, a deep crimson-purple spot at the base of each, strew the ground almost before we can admire them. Five species grow wild in England, chiefly affecting the limestone districts; one or two of them are often planted upon rockeries, but none occur spontaneously nearer Manchester than Buxton.

XV.—THE CABBAGE FAMILY. *Cruciferæ* or *Brassicáceæ.*

Herbaceous plants, three inches to three feet high. Leaves simple, alternate; often sessile, stem-clasping, and auricled; still oftener deeply pinnatifid, and seemingly pinnate, divided and undivided

leaves frequently occurring upon the same stem, but in that case the divided ones are always at the lower part. Flowers regular, numerous, in general small and inconspicuous, except from their plenty; composed of four slender sepals, and four petals, placed crosswise (as in Fig. 102); usually white or yellow, sometimes red, lilac, crimson, or purple; generally without perfume, though when present, it is very strong and aromatic. Inflorescence beginning as a terminal corymb, afterwards a long upright raceme, the lower flowers generally overblown and succeeded by the young seed-pods before the topmost have expanded, so as to present every stage between flower-bud and fruit, and allow the latter to supply characters while the plant is yet in bloom, a fortunate circumstance in a family almost impossible to discriminate without their aid. Stamens six, four long and two short. (Fig. 99.) Pistil one, stigmas two, sessile. When ripe, the seed-pod consists in almost every instance of two thin walls, separated by a delicate and transparent white partition, having the seeds attached to its surfaces, and remaining after the external parts have fallen away. When long and narrow, as in Figs. 98, 100, 101, it is termed a "silique;" when short and broad, as in Fig. 103, it is called a "silicle," but in either case is peculiar to the family. The thin silvery white membranes left on the peduncles after the outer pieces and the seeds have fallen away, frequently form conspicuous and pretty objects. In the radish and a few others the partition is not developed.

Fig. 98.
Silique of Cardamine.

Fig. 99.
Stamens of Cruciform flower (magnified).

Fig. 100.
Silique.

The Cabbage Family, though not one of the most showy or extensive, is in every way valuable and interesting. The rare uniformity of its structure renders it highly deserving the attention of the botanical

student, while the uses it subserves make it important to all. Not a single unwholesome plant occurs in it, while very many species form excellent articles of food, as cabbage, "greens" of nearly all kinds, the cauliflower, broccoli, turnip, sea-kale, water-cresses, and the pungent radish. The general properties of the family are stimulant and antiscorbutic, with now and then a little acridity superadded. Mustard and horseradish, in which the acrid matter is somewhat concentrated, become, on this account, agreeable condiments. The seeds of many species contain abundance of oil.

Fig. 101.
Spray of Siliques.

Fig. 102.
Cruciform flower.

Fig. 103.
Spray of Silicles.

The principal seats of these plants are Northern Europe and Asia, though they are scattered thinly nearly all over the world. Upwards of 200 grow in the frigid zone, where they constitute a chief part of the vegetation. Seventy species are indigenous to Britain, twenty-eight of them growing spontaneously, or as colonists, about Manchester. Few of the latter have claim to beauty of aspect, and most are weedy and small-flowered. They may be classed into yellow-flowered, and white or lilac-flowered.

- **A.—All the leaves simple and undivided.**
  - Leaves all broadly lanceolate, slightly toothed, tapering into a short petiole ..... 21. Worm-seed.
  - Stem-leaves arrow-shaped, sessile, or auricled ..... 7. Gold of Pleasure.
- **B.—Lower leaves pinnatifid, and often lyrate.**
  - Plant very little branched, erect, stiff, dark-green. Flowers bright golden yellow.
    - Upper leaves oblong, toothed, undivided; plant perennial ..... 15. Common Yellow-Rocket.
    - Upper leaves pinnatifid; plant biennial ..... 16. Early Yellow-Rocket.
  - Plant much branched; branches spreading.
    - Petals not longer than the calyx.
      - Pods slender, upright, and in a line with the stem ..... 20. Hedge-mustard.
      - Pods curved, bulging, and bent away from the stem ..... 18. Land Yellow-cress.
    - Petals longer than the calyx.
      - Petals veined with blueish-violet; plant large and coarse .. 28. Wild Radish.
      - Petals not veined.
        - Water-side plant; seed-pods usually abortive .... 19. Water Yellow-cress.
        - Dry-land plants; pods usually full.
          - Calyx spreading.
            - Pods slender, smooth, four-angled, appressed .... 27. Grocers' Mustard.
            - Pods bulging, usually hairy, many-angled, spreading 26. Charlock.
          - Calyx erect; upper leaves stem-clasping.
            - Root-leaves smooth, root spindle-shaped ..... 24. Rape.*
            - Root-leaves hairy.
              - Root long and slender ..... 23. Navew.*
              - Root globular, fleshy ..... 25. Turnip.*

THE CABBAGE FAMILY.

Section 1.

YELLOW-FLOWERED.

* These three are unquestionably the same species, the original or wild form being the Navew, and the Rape and Turnip varieties induced by cultivation.

THE CABBAGE FAMILY.

Section 2.

WHITE or LILAC-FLOWERED.

- **A.—Petals pure white, without coloured veins.**
  - Leaves all simple and undivided.
    - Leaves heart-shaped, roundish, on long stalks; plant smelling like garlick, when bruised ..... 22. Garlick White-cress.
    - Leaves lanceolate, oval, or oblong.
      - Leaves 12—18 inches long; stems 2—3 feet high ..... 5. Horse-radish.
      - Leaves never more than an inch long.
        - *a.* Seed-pods circular, half-an-inch broad, and notched at the top ..... 8. Penny-cress.
        - *b.* Seed-pods oval and pointed; petals cleft .... 6. Spring Whitlow-wort.
        - *c.* Seed-pods needle-shaped; petals not cleft .. 14. Thale-cress.
  - Leaves more or less pinnate or pinnatifid.
    - Lower leaves pinnatifid; upper ones oval or lanceolate.
      - Seed-pods heart-shaped, the angles pointed..... 1. Shepherds'-purse.
      - Seed-pods oval or circular.
        - Stem single, branched above, annual; style short 3. Common Field-cress.
        - Stem branched at the base, perennial; style long and projecting ..... 4. Smith's Field-cress.
    - Leaves all pinnate.
      - Stem leafless, three inches high; seed-pods nearly circular. Two petals longer than the others..... 2. Teesdale's-cress.
      - Stem leafy.
        - Seed-pod roundish and wrinkled..... 9. Small Wart-cress.
        - Seed-pod long, slender, and smooth.
          - Seeds in a double row in each division of the pod ..... 17. Water-cress.
          - Seeds in a single row.
            - Petals nearly erect; flowers numerous & small.
              - Stamens 4 .. 10. Common Bitter-cress.
              - Stamens 6 .. 11. Grove Bitter-cress.
            - Petals spreading: flowers few and large ..... 12. Great Bitter-cress.

- **B.—Petals white or pale lilac, with dark veins.** (See also No. 12.)
  - Lower leaves pinnate, upper ones pinnatifid, with linear segments..... 13. May-flower.
  - Lower leaves lyrate, upper ones narrow and undivided..... 28. Wild Radish.

HABITATS AND LOCALITIES.

1. Shepherds'-purse—(*Capsélla Bursa-pastóris.*)

Wherever upon dry land a plant can grow. In gardens a constant and ineradicable weed, varying from three inches to two feet high. Fl. May—November. Annual.

Curtis, i. 50; E. B. xxi. 1485 (both as *Thláspi Bursa-pastóris*); Baxter. iii. 191.

The triangular pods are unique among British Crucifers.

2. Teesdale's-cress—(*Teesdália nudicaúlis.*)

Rather rare. Abundant on sandy hedgebanks near Bowdon new Church, and in the neighbourhood of Congleton. Knutsford race-ground. Prestwich. Fl. May, June. Annual.

Curtis, ii. 406 (as *Ibéris nudicaúlis*); E. B. v. 327; Baxter, vi. 423.

3. Common Field-cress—(*Lepídium campéstre.*)

Common in dry fields. Fl. May—July. Annual.

Curtis, ii. 337; E. B. xx. 1385 (both as *Thláspi campéstre*).

4. Smith's Field-cress—(*Lepídium Smíthii.*)

Hedgebanks in a few places about Timperley and Sale. Abundant on the bank by the canal between Broadheath Bridge and Seaman's Moss Bridge. Near Monton Chapel, and in the lane leading from Irlams-o'th'-Height to Eccles. (J. S.) Fl. June, July.

E. B. xxvi. 1803.

5. Horse-radish—(*Cochleária Armorácia.*)

Naturalized, from the refuse of gardens, in a few places on the banks of the Irwell and the Mersey, near their confluence. Also abundant about Timperley, and on the banks of the Goyt, below Strines. Fl. May, June.

E. B. xxxiii. 2323.

6. Spring Whitlow-wort—(*Drába vérna.*)

Dry hedgebanks, and upon walls where earth has collected; not very common. Chiefly in the district lying between Withington and Bowdon. Worsley Lane. (J. E.) Sandy Lane, Pendleton. (J. S.) Fl. March, April. Annual.

Curtis, i. 49; E. B. ix. 586; Baxter, i. 30.

7. Gold of Pleasure—(*Camelina sativa.*)

In ploughed fields, occasionally, and in gardens, among flax, from imported seeds. Prestwich, and Thornham, near Middleton. (J. P.) Fl. June, July. Annual.

Curtis, iii. 512; E. B. xviii. 1255; Baxter, vi. 447.

8. Penny-cress—(*Thláspi arvénse.*)

Dry fields, rare. Little Hulton. (G. H.) Tyns Bank, near Tyldesley, 1858. (J. E.) Fl. June. Annual.

Curtis ii. 407; E. B. xxiv. 1659.

The large, round, flat, semi-transparent pods, resembling silver pennies, render this a very interesting and pretty plant.

9. Small Wart-cress—(*Senebiera dídyma.*)

On Barton Moss, sparingly, an arrival within the last three or four years, for which we are indebted, perhaps, to the sea-birds that often visit it. (J. S.) Fl. July. Annual.

E. B. iv. 248.

10. Common Bitter-cress.—(*Cardamine hirsúta.*)

In waste and cultivated ground, common everywhere. Fl. March—September. Annual.

Curtis, ii. 268; E. B. vii. 492.

The name *hirsuta* is rather infelicitous, the plant being as often smooth as hairy.

11. Grove Bitter-cress—(*Cardamine sylvática.*)

In shady places, common everywhere, but loving best to sit in the clefts and crevices of mossy rocks near dropping water, where it can be softly and continuously sprinkled. Fl. summer. Annual.

12. Great Bitter-cress—(*Cardamine amára.*)

Marshy places, where somewhat shaded by trees. Plentiful in Cotterill Clough, about Bowdon, Rostherne, Bedford, Blakeley, Rainsall, in Clayton Vale, and in the Reddish Valley. Fl. May.

Curtis, i. 184; E. B. xiv. 1000.

A striking and beautiful plant, well marked by its large and conspicuous purple anthers.

13. May-flower—(*Cardamine praténsis.*)

In moist meadows, everywhere, especially where subject to inundation by rivers, loving alluvial richness of soil, and flowering in April and May, just after the sweet violets, and when the note of the cuckoo begins to "sound sweetly through the air."

Curtis, i. 185; E. B. xi. 776; Baxter, ii. 141.

Occasionally found double, and in this state commonly cultivated in gardens.

The Cardamines are distinguished from all other plants of the family by the way in which the seed-pods open. As soon as ripe, the side pieces detach themselves at the lower extremity, roll up quick as lightning into a coil resembling a watch-spring, and shoot out the seeds in all directions. In the *Cardamine hirsuta* it is particularly remarkable. When invading a sylvan settlement of these little irritables in early summer, especially if the day be fine and warm, the vigour with which they discharge their tiny artillery is quite facetious. (See Fig. 98, p. 112.)

14. Thale-cress—(*Arabis Thaliána.*)

Dry hedgebanks and cultivated fields, common. Fl. April. Annual.

Curtis, i. 122; E. B. xiii. 901.

15. Common Yellow-Rocket—(*Barbaréa vulgáris.*)

Frequent in moist meadows, and on the banks of rivers and streams. Fl. May—August.

E. B. vii. 443 (as *Erysimum Barbaréa*); Baxter, vi. 450.

A double-flowered variety is common in cottage gardens.

16. Early Yellow-Rocket—*Barbaréa præcox.*)

Common in cultivated fields. Chorlton, Withington, Prestwich, Reddish. Fl. spring. Biennial.

E. B. xvi. 1129 (as *Erysimum præcox*).

The pods are thrice as long as in the common yellow-rocket, smooth, and exactly square.

17. Water-cress—(*Nastúrtium officinále.*)

Brooks and pondsides, common; the best and finest about Lymm. Fl. June, July.

Curtis, ii. 408; E. B. xii. 855 (both as *Sisymbrium Nastúrtium*).

It is prudent for pedestrians and excursionists who purpose enjoying water-cresses on the spot where gathered, to take a little salt in their pockets. No plant can well be mistaken for water cresses except a deleterious one of the

Parsley-family; but in that the leaf-stalks are hollow, and the leaflets serrated, whereas in the water-cress, the stalks are solid, and the leaflets entire. Brook-lime, a pungent plant, often found and gathered with water-cresses, and which may be eaten with safety, has simple and undivided leaves, growing in opposite pairs, and the flowers, in their season, of a brilliant azure.

18. Land Yellow-cress—(*Nastúrtium terréstre.*)

In waste places, especially where water has stood, common. Very abundant about Disley. Fl. June—September. Annual.

Curtis, ii. 341; E. B. xxv. 1747 (as *Sisymbrium terréstre*).

19. Water Yellow-cress—(*Nastúrtium amphíbium.*

Pondsides between Old Trafford and Stretford, rare. Ponds behind the Art-Treasures building site. Fl. July, August.

E. B. xxvi. 1840 (as *Sisymbrium amphíbium*).

The leaves of the submerged branches often become deeply pectinated, as happens with those of the water snow-cups, and with many other semi-amphibious plants where the structure of the leaves is favourable to it.

20. Hedge-mustard—(*Sisymbrium officinále.*)

Roadsides, and on dry, parched hedgebanks, everywhere, loving drouth and dust, which latter it seems to have a peculiar aptitude for collecting. Fl. June, July.

Curtis, ii. 342; E. B. xi. 735 (both as *Erysimum officinále*).

A singular plant, readily distinguished by its pyramidal figure; long, rigid, outstretched, horizontal branches, leafless at the end; little terminal clusters of minute flowers, and pods in a line with the stem.

21. Worm-seed—(*Erysimum cheiranthóides.*)

Fields and hedgebanks near the Mersey, between Rixton and Carrington, and between Barton and Irlam; in the latter place as plentiful a few years ago as if handfuls of seed had been thrown broadcast, but now much reduced in quantity. Found also on the edge of Chat Moss, at Astley, and near Ladywell Brow, Worsley. (J. E.) Fl. July, August. Annual.

E. B. xiv. 942; Baxter i. 62.

22. Garlic White-cress—*Alliária officinális.*)

Hedgebanks, shady lanes, and waste places, everywhere. Fl. May, June. Annual.

Curtis, i. 121; E. B. xii. 796.

23. Navew—(*Brássica campéstris.*)

Cultivated fields and waste places, common. Fl. June, July. Annual.

E. B. xxxii. 2284.

Often confounded with charlock, the *Sinapis arvénsis*, from which, however, it may readily be distinguished by the smoothness and glaucous hue of its upper leaves.

24. Rape—(*Brássica Nápus.*)

Ploughed fields and waste places, a descendant of cultivation. Frequent on the banks of the Bollin, below Bowdon. Fl. May, June. Biennial.

E. B. xxx. 2146.

25. Turnip—(*Brássica Rápa.*)

In similar situations, and of corresponding origin. Fl. April, May. Biennial.

E. B. xxxi. 2176; Baxter, vi. 458.

26. Charlock—(*Sinápis arvénsis.*)

Common among corn and other field crops. Fl. May, June. Annual.

Curtis, ii. 339; E. B. xxv. 1748.

The purple colour of the stalks about the joints is often a ready mark of this farmer's pest.

27. Grocers' Mustard—(*Sinápis nigra.*)

Occasionally in waste places and by waysides, a runagate more or less recent, from neighbouring gardens. Fl. June, July. Annual.

E. B. xiv. 969; Baxter, v. 336.

The seeds supply the mustard of the cruet-stand. *Salad*-mustard is the *Sinápis álba.* (Curtis, ii. 338.)

28. Wild Radish—(*Ráphanus Raphanistrum.*)

Among the crops on ploughed land, common, the lilac variety most usual, though lilac, white, and yellow sometimes mingle in the same field. Fl. June, July. Annual.

Curtis, ii. 266; E. B. xii. 856; Baxter, v. 359.

The ornamental Cruciferæ grown in gardens are as numerous as the wild species. Here we can only mention the white Arabis or mountain-snow, one of

the earliest and shewiest blossoms of spring, its hoary herbage forming dense round cushions, almost hidden by the flowers;—the fragrant wall-flower, "stained with iron-brown," both single and double, old-fashioned but never antiquated;—the purple Hesperis, and the sweet Alysson, again with hoary foliage, and crowds of small golden-yellow blossoms;—the Virginian stock, so pretty for edgings to borders;—the fragrant and weak-petaled Brompton stocks or "gilliflowers," white, purple, or crimson, the latter, when double, more like carnations than Cruciferæ;—the candy-tufts, distinguished by the inequality of their flowers;—the *Schizopetalon*, a deliciously fragrant little plant, with pinnatifid petals; and lastly, the "honesty" or *Lunária*, the beauty of which lies in its great oval silvery shields, as large as a florin, and enduring through the winter.

Cauliflowers and broccoli, it may be well to add, are peculiar varieties of the common cabbage, in which there is a tendency to produce an enormous quantity of flower-buds. It is these, along with their incipient stalks and peduncles, which constitute the large frothy heads so deservedly esteemed for the dinner-table. Savoys, red-cabbage, and all other vegetables of the kind, are derived from the same invaluable plant, the *Brassica olerácea*, which is a weed at the same moment on the sea-coast.

XVI.—MIGNONETTE FAMILY. *Resedáceæ.*

Herbaceous plants, with slender stems, sometimes half-procumbent; alternate, narrow-lanceolate, or pinnatifid leaves; and terminal racemes or spikes of small but very numerous yellowish flowers, exceedingly irregular in their form. Calyx of several narrow sepals; petals unequal and five to six-cleft; stamens about twelve, standing along with the petals on a large, glandular, and lateral plate; ovary solitary, three-lobed, with three sessile stigmas, and opening at the top before ripe,—a striking characteristic. Seeds numerous and kidney-shaped.

A little family confined to Europe and the borders of the Mediterranean, and made interesting by the fragrant species which gives name to it, botanically the *Reséda odoráta*, indigenous to the northern edge of Africa.

Three species grow wild in our island, and two of them sparingly near Manchester. The flowers in both are yellowish-green.

1. Leaves narrow-lanceolate, three or four inches long; spike long and slender ..... Common Weld-wort.
2. Leaves three-cleft; lower ones pinnatifid; spike short and pyramidal ..... Yellow Weld-wort.

HABITATS AND LOCALITIES.

1. Common Weld-wort—(*Reséda Lutéola.*)

Very rare. On banks by Hollins Ferry, on the Cheshire side of the river, and between there and Warburton, near the water. (February, 1858.) Lime Pits, Bedford, every year. (G. H.) Fl. July. Biennial.

E. B. v. 320.

2. Yellow Weld-wort—(*Reséda lútea.*)

Very rare. Sandy lanes at Statham, near Lymm. (Mrs. Brownell.) Bowdon, near the Independent Chapel on Rose Hill. Irwell bank, near Irlam, every year. (J. S.) Fl. July, August.

E. B. v. 321; Baxter i. 15.

The tall and pretty *Reséda fruticulósa*, (E. B., Supp. i. 2628.) distinguished by the glaucous hue of its pinnate leaves, and white flowers, is occasionally seen in gardens, but in general only the typical species, or true mignonette, which is also the only fragrant one.

XVII.—THE VIOLET FAMILY. *Violáceæ.*

Of this family there are two distinct sections, one confined to South America, shrubby in habit, and with regular flowers; the other comprising herbaceous plants, of northern temperate latitudes, with the flowers not regular. The latter, which alone concern us here, present the following characters:—Stems slender, three to twelve inches high, but often procumbent; leaves simple, petiolate, and stipuled; flowers solitary, on long peduncles, yellow, blue, purple, or white, or with a mixture of all these colours; sepals five, generally enlarged at the base; petals five, unequal, the lower one with a protuberance, or sometimes a tail or "spur." Stamens five, their anthers short, broad, crested, and united in a ring; ovary single, one-celled; stigma oblique; capsule three-valved, with numerous shining seeds.

The exotic members of the family are in some cases medicinal in their roots, supplying ipecacuanha, but the European ones, though similar in properties, are of very slight importance, except for the neatness and variety of their copious flowers.

Nine species grow wild in England, and six of them near Manchester.

- A. — Stipules very small, lanceolate, and pointed.
  - Sepals short, broad, and obtuse.
    - Plant with creeping runners; flowers fragrant, white or "violet".. 1. Sweet Violet.
    - No runners; flowers dull pale blue, with darker streaks, scentless, flat, and roundish. Leaves kidney-shaped ..... 2. Marsh Violet.
  - Sepals very narrow lanceolate and acuminate; flowers large, light-purple, scentless.... 3. Dogs' Violet.
- B.—Stipules as large as the leaves, and divided, the centre lobe large, broad, and obtuse.
  - Stipules pinnatifid and lyrate: the terminal lobe crenate.
    - Petals much larger than the calyx; flowers flat, three-coloured, shewy; capsule egg-shaped ..... 4. Common Pansy.*
    - Petals not longer than the calyx; flowers concave, whitish, inconspicuous; capsule nearly globular ..... 5. Hedge Pansy.*
  - Stipules five-cleft and palmate, the terminal lobe entire; flowers gay, usually bright-yellow..... 6. Yellow Mountain Pansy.

THE VIOLET FAMILY.

* These two are probably only forms of a single species, and it is by no means certain that the mountain pansy is truly different from them.

HABITATS AND LOCALITIES.

1. Sweet Violet—(*Viola odoráta.*)

Upon hedgebanks, and at the foot of walls, among grass, but exceedingly local. Hough-end Hall farm-yard; Denton Hall; abundant on a hedgebank near Offerton Hall, between Stockport and Marple; about Bowdon, not uncommon; and at Astley, Weaste Lane, and near Peel Green Bridge (J. S.), rather sparingly. Fl. March, April.

Curtis, i. 63; E. B. ix. 619.

Common in gardens, and probably an escape from them when found near buildings.

Surprise is often excited by the violet producing ripe capsules of seed, when to appearance no flowers have been left to originate them. The capsules come of a *second* crop of flowers, deficient in petals, and consequently unobserved. A similar thing is observable in the Touch-me-not, only that there it is the *first* flowers which are incomplete.

2. Marsh Violet—(*Viola palústris.*)

Common in wet and boggy places. Mere Clough; Prestwich Hills; Hale Moss; Rostherne Mere. Fl. May—July.

Curtis, i. 203; E. B. vii. 444.

3. Dogs' Violet—(*Viola canina.*)

Everywhere on hedgebanks, and in the drier parts of woods, following the *odoráta;* and although scentless, a delightful ornament of the spring and early summer.

Curtis, i. 134; E. B. ix. 620; Baxter i. 4.

The little variety called *flavicornis*, distinguished by its yellow spur, has been gathered on Hale Moss, and by the roadside between Bowdon Downs and the old Church. (E. B., Supp. ii. 2786.)

4. Common Pansy—(*Viola tricolor.*)

Everywhere in clover-fields, and on ploughed land generally. Frequent also on hedgebanks. Fl. April—October.

Curtis, i. 65; E. B. xviii. 1287.

The parent-form, seemingly, of the innumerable fancy varieties of the flower-garden; acknowledged universal favourites by the medley of names which this species has received, as "Love-in-idleness" (as old at least as the time of Shakspere), "Trinity Herb," "Jump-up-and-kiss-me," and "Heart's-ease" (a very natural and proper result).

5. Hedge Pansy—(*Viola arvénsis.*)

Hedgebanks. Fl. throughout the summer.

E. B., Supp. i. 2712.

6. Yellow Mountain Pansy—(*Viola lútea.*)

Very abundant on the Buxton road, beyond Disley, frequently growing on the wall-tops. Shuttlings Lowe, near Congleton, abundant. (Mr. Holland.) Beyond Mottram, and near Stalybridge Brushes, sparingly. (B. G.) Fl. May—September.

E. B. xi. 721.

In gardens, the only important *Viola* besides the *tricolor*, is a pale blue-flowered species, with a remarkably long tail, called *calcaráta*, or the "spurred." Occasionally we see the *Erpétion reniformis*.

XVIII.—THE STONE-CROP FAMILY. *Crassuláceæ.*

Herbaceous plants, sometimes a little woody at the base. Leaves simple, scattered, often lumpy, swollen, and deformed, owing to their extreme succulence, whereby the skin is enormously distended. Flowers simple, regular, and pentamerous, presenting in many a most beautiful star-like figure, made more conspicuous by their vivid and decided colours, which are generally some shade of yellow or red, though white is not rare. Stamens normally ten; exceptionally five,

Fig. 104.
Cuticle of Sedum leaf, shewing stomates (highly magnified).

twelve, or twenty-four. Ovaries five, except when the stamens are in excess, and invariably *free*. Carpels erect, opening lengthwise when ripe; seeds numerous, in a double row. The intensely succulent character of the foliage, the fewness of the stamens, and the freedom of the ovaries, constitute an easy clue to this curious family. All these circumstances are common, but it is only in the *Crassuláceæ* that they exist in combination.

Sprinkled all over the world, the 300 known species of this family

are remarkable for growing on sun-scorched rocks and naked walls, on roofs, and sandy plains, such as plants differently constituted could not endure for a day; and though they are seen occasionally with their roots in the earth, it is not that they require the soil as a source of nutriment, but simply as anchorage. They take their food almost entirely through the pores of the leaves,—those delicate mouths, or "*stomates*," invisible to the naked eye, which serve in all plants as the principal avenues of sustenance, and which, as proved in the present instance, are competent to supersede the functions of the spongioles altogether. Nothing is more extraordinary in English Botany than to see the little *Sédum ácre* sitting in golden epaulettes on the tops of mountain walls, exposed to the hottest rays of the noontide sun, and flourishing most where they come earliest and last the longest. The red orpine will live for months, suspended by a string, without being once supplied with water. I have had a branch of it grow freely after being placed between papers and pressed for the herbarium. The properties of the family are cooling and detergent, combined in some cases with acridity.

Sixteen species occur in England, and four of them, sparingly, near Manchester.

A.—*Stamens ten; sepals and petals each five.*

Stems two to three inches high; leaves minute, solid, egg shaped.

1. Flowers bright golden yellow ..... GOLDEN STONE-CROP.
2. Flowers white, tinged with rose-colour; leaves almost globular ..... THICK-LEAVED WHITE STONE-CROP.
3. Stems twelve to eighteen inches high; leaves broad, flat, oblong, thin. Flowers red or rosy purple ..... RED ORPINE.

B.—*Stamens usually twelve or twenty-four.*

4. Sepals and petals usually ten or twelve; leaves broad, thick, solid, ending in a sharp point, and collected in dense rosettes, which hang together by cords, and form mounds of a yard or two in circumference. Stems eight to sixteen inches high. Flowers red or rosy purple ..... HOUSE-LEEK.

HABITATS AND LOCALITIES.

1. LITTLE GOLDEN STONE-CROP—(*Sédum ácre.*)

Hedgebanks about Bowdon, and common at Marple, but leafier and less fulgent than on rocks and walls. Fl. June, July.

Curtis, i. 32; E. B. xii. 839; Baxter, v. 364.

Common upon rockeries, and sometimes immolated in the open borders.

2. Thick-leaved White Stone-crop—(*Sĕdum dasyphyllum.*)

On a garden wall at Hyde. (Mr. J. Sidebotham.) Fl. July.

Curtis, i. 171; E. B. x. 656.

3. Red Orpine—(*Sĕdum Telĕphium.*)

Hedgebanks near Withington, Leigh, Agecroft, Rhodes, Irlam, Ashley, and other places, but sparingly. Plentiful at the edge of the orchard in Fox-hill fields, Barton.

Curtis, i. 170; E. B. xix. 1319.

Common in gardens.

4. House-leek—(*Sempervivum tectórum.*)

Upon cottage roofs and the ends of walls, common, but not truly wild. Fl. July, August.

Curtis, i. 174; E. B. xix. 1320; Baxter, vi. 401.

Many Crassulaceæ are grown for ornament, especially *Sedums* upon rockeries, and the Rose-root or *Rhodiola rosea*, (E. B. viii. 508.) a plant with numerous succulent stems, six inches high, thickly clothed with flat, oval, glaucous leaves; and the flowers, which are minute and yellowish green, in dense terminal corymbs. The root, when freshly cut, exhales an odour resembling that of the monthly rose. The Cobweb House-leek or *Sempervivum arachnoideum* has rosettes like those of the *S. tectórum*, but smaller, and with white fibres crossing backwards and forwards from leaf to leaf, as if a spider had spun its web among them. In green-houses the splendid *Crássula coccínea* is the most beautiful and frequent representative of the family, though emulated by many *Sedums*, *Sempervivums*, and *Echevérias*, crimson, scarlet, and yellow.

XIX.—THE HEATH FAMILY. *Ericáceæ.*

Shrubs, varying from a few inches to twelve or fifteen feet in height. Leaves simple, undivided, more or less oval or linear, often rigid, and usually evergreen. Flowers simple, generally regular, more or less bell-shaped, purple, lilac, crimson, yellow, or white, very rarely fragrant. Calyx and corolla sometimes of five leaves each, sometimes of four, always more or less united at the edges, and enclosing the ovary. Stamens eight, or five, or ten, according as the flower is tetramerous or pentamerous, the anthers usually furnished with peculiar appendages, and opening by two pores at the extremity, as very

plainly seen in the *Rhododéndron*. The latter circumstances are eminently characteristic. At first sight there seems something discrepant in bringing the Heaths, the Azáleas, and the Rhododéndrons into one family, but no plants are more closely allied, nor is the seeming contrast greater than is met with in many other families.

This extensive and favourite family contains some of the most beautiful plants cherished by gardeners, and contributes not a little, in three or four of its species, to the decoration of our country. The true Heaths or *Ericas* belong chiefly to the Cape of Good Hope, where

Fig. 105.
Common Heather.

Fig. 106.
Blushing-maiden Heath.

Fig. 107.
Crimson Heath.

immense tracts are covered with the lovely species that give so much beauty to our green-houses, and in a state of perfection scarcely surpassed by the most carefully-nurtured specimens of the florist. Europe and America, both North and South, contain abundance of the miscellaneous species, though in America there is not a single *Erica*. The family is met with also on the Himalayahs, where grow some of the most magnificent Rhododendrons in the world. Few species are of economical value. Astringency marks a small number, and some have eatable fruits.

Fourteen species grow wild in England, and five of them near Manchester.

- **A.—Calyx and corolla four-parted; stamens eight.**
  - Leaves minute, closely imbricated in four rows up the stems. Outer calyx green; inner calyx large and coloured, and, like the petals, rose-colour or lilac, and shining. Racemes unilateral. (Fig. 105.) ..... 1. COMMON HEATHER.
  - Leaves linear, spreading.
    - Flowers deep crimson, in oblong, irregular racemes. Leaves three in a whorl, linear, and without fringes. (Fig. 107.) ..... 2. CRIMSON HEATH.
    - Flowers light rose-colour, in dense terminal clusters, all turned one way. Leaves four in a whorl, narrow and fringed. (Fig. 106.) .. 3. BLUSHING-MAIDEN HEATH.
- **B.—Calyx and corolla five-parted; stamens ten.**
  - Stems trailing. Leaves obovate, obtuse, evergreen, turning red in autumn; flowers in drooping racemes, rose-coloured. Fruit a bright-red, mealy berry ..... 4. BEARBERRY.
  - Stems upright. Leaves lanceolate, pointed, revolute, evergreen; flowers flesh-coloured, in drooping umbels, on pink peduncles. Fruit a roundish capsule, with many seeds ..... 5. ANDROMEDA.

II

THE HEATH FAMILY.

HABITATS AND LOCALITIES.

1. Common Heather—(*Callúna vulgáris.*)

Heaths, moors, in dry cloughs, and scrubby places; loving also the steep banks of wooded ravines that lie faceward to the sun; abundant everywhere. Mere Clough; Summerseat Woods; remarkably fine at Greenfield, where it is collected for making besoms, and on the borders of Carrington Moss. Fl. August, September.

Curtis, ii. 322; E. B. xv. 1013 (both as *Erica vulgáris*).

The sprays of this charming plant, if gathered just before perfection, retain their colour for years, and make very pretty parlour ornaments. The young stems supply an excellent example of imbricated leaves, and might have furnished the patterns for some of the closely-woven gold chains used for watch-guards. Few flowers yield more honey; and since they are twentyfold more numerous in the same space than those of any other plant, the bees collect their harvest with rapidity. There is a variety with white blossoms, often cultivated in gardens, another of a rich red, and a third with the flowers double. A fourth variety has the stems covered with down. The conspicuous part of the flower is the inner calyx.

2. Crimson Heath—(*Erica cinérea.*)

Dry moorlands and hilly wildernesses. Fine and abundant at Greenfield, and in the most charming luxuriance and plenty at Stalybridge Brushes. Sparingly on Alderley Edge and Hale Moss. A white variety has been gathered at Greenfield. Fl. July, August.

Curtis, i. 98; E. B. xv. 1015.

The flowers turn purple the day after they have been gathered, and retain this colour indefinitely. They are so dry and juiceless that, even when fresh, they rustle as if withered.

3. Blushing-maiden Heath—(*Erica Tétralix.*)

Heaths, moors, and mosses, abundant. Carrington Moss; Alderley Edge. Fl. June—September.

Curtis, i. 21; E. B. xv. 1014; Baxter, vi. 418.

The blossoms seem a cluster of waxy berries rather than flowers; they retain their colour longer than those of the *E. cinerea*, and are sometimes found pure white. In the ordinary state, the part of the corolla next to the stem is of a lighter colour than that which is exposed, where it deepens to a delicate blush, sometimes amounting to a fine full crimson.

4. Bearberry—(*Arctostáphylos Uva-úrsi.*)

On our high moorlands, not uncommon. Hills above Tintwistle and Rawtenstall; Greenfield; and on grizzly Kinder-Scout. Fl. May.

E. B. x. 714 (as *Arbutus Uva-ursi*); Baxter, vi. 502.

5. ANDROMEDA—(*Andrómeda polifólia.*)

In company with the heaths, sundews, and cotton-grasses or silver-tassels, upon all the moors and mosses of the district. A white variety has been gathered on Barton Moss. (J. S.) Fl. June—September.

E. B. x. 713; Baxter, v. 361.

So many delicious flowers and handsome shrubs of this family adorn our gardens, that it is difficult to particularise. They include Rhododéndrons of all kinds, Azáleas, the Arbutus or strawberry-tree (E. B. xxxiv. 2377), Kálmias, Lédums, Menzíesias, hardy Ericas, the Gaulthéria, the Epigæa, and the elegant Clethras. Most of these are common, and the two first-named universal. The honey of the common yellow Azalea, or *A. Póntica*, and likewise that of the Kalmias, is reputed poisonous. The latter are known by the exquisite cup-form of their delicate pink or white corollas, in many kinds nearly the size of the bowl of the acorn, with niches for the stamens, in which they lie recurved till the anthers are ready to burst, when they spring up in succession, and spirt their pollen upon the stigma. The Lédums have umbels of white flowers, and the leaves covered upon the underside with brown wool. The hardy Ericas, with their needle-like foliage, and plentiful rosy or white bells, in upright racemes, often with the anthers protruding, are among the earliest harbingers of spring, and reappear with the asters and dahlias of September. The green-house Ericas are perhaps the loveliest plants in cultivation. Every shade of pink, red, crimson, and green, with the purest pearly white, and occasionally yellow, is met with in their different species; while in form their corollas exhibit every possible modification of the flask, the tube, and the vase: many are round as an air-bubble. The surface is in some as smooth as the finest porcelain, in others hairy, silky, or glutinous; and the foliage in every instance needle-like, plentiful, and evergreen.

XX.—THE EPACRIS FAMILY. *Epacrideæ.*

Evergreen shrubs, similar externally to the true heaths of the Heath Family, but differing from them in having only one cell to the anthers, which opens longitudinally; whereas in the Heath Family there are two cells, which open by terminal pores. The stamens, moreover, very commonly adhere to the sides of the corolla, while in the Heath Family they are almost without exception on the receptacle. The conspicuous distinction from the true heaths lies in the pentamerous flower, that of the former being tetramerous. The *Epacrideæ* are also

more rigid in their stems, as well as remarkable among Exogens for the parallel veins of their leaves.

Over 300 species of this truly beautiful family have been determined, all natives of the Indian Archipelago, Australia, or Polynesia, where they abound as *Ericas* do at the Cape of Good Hope. In our green-houses they almost rival the heaths, growing like them, upright, shrubby, and two to four feet high, and hung with innumerable little tubes or globular bells, usually pink or white. None surpass the old *Epacris grandiflora*, the first that was introduced, now fifty-five years ago. Species of *Lysinema* and *Sprengelia* likewise occur in good collections.

XXI.—THE WINTERGREEN FAMILY. *Pyrolaceæ.*

Very pretty little herbaceous plants, with large round flat leaves, which are mostly radical, and grow in a rosette; the stems solitary, six to eight inches high, and bearing one or more elegantly bell-shaped, drooping, pinkish-white pentamerous flowers, not unlike those of a heath, as are also the anthers. They would be included in the Heath Family were not their foliage and habit of growth so widely different. About twenty species are known, natives pretty generally of northern temperate latitudes. Five grow wild in England, and two of them have been gathered near Manchester.

1. Leaves roundish, petiolate, and crenate. Style long, straight, and protruding beyond the corolla. Petals and stamens incurved ..... } Common Wintergreen.

2. Leaves, petals, and stamens like the former, but the style shorter than the corolla, with a broad, five-lobed, spreading stigma ..... } Small Wintergreen.

HABITATS AND LOCALITIES.

1. Common Wintergreen—(*Pyrola media.*)

Formerly found at Seal-Bark, Greenfield, a romantic and rugged place, full of caves, the scene of the celebrated adventure in 1847, when Mr. Sidebottom and Mr. Wrigley, searching for the source of the

Etherowe, were prisoners for the night, through losing their way. "In the neighbourhood of Mottram." (B. G.) Fl. July, August.

Curtis, iii. 489; E. B. xxviii. 1945.

2. Small Wintergreen—(*Pyrola minor.*)

Chat Moss. (Mr. William Chambers.) Fl. July.

Curtis, iv. 609; E. B. iii. 158; Baxter, iii. 239.

XXII.—THE RHUBARB FAMILY. *Polygonáceæ.*

Herbaceous plants, frequently of coarse and ungainly habit in stems and foliage; the flowers numerous, individually minute, but conspicuous in their large panicles or spikes. Leaves alternate, petiolate, simple, often broad and large, with membranous stipules, which form a thin semi-transparent sheath round the stalk, technically called an *ocrea*, and, generally speaking, sufficient to stamp the family. Flowers regular, consisting of calyx only, in five or six pieces, pink, white, or greenish; five, six, or eight stamens inserted on the base of the perianth, and a solitary, one-seeded ovary, which is free, and surmounted by two or more styles or stigmas, the latter in some cases prettily tufted. Fruit usually a triangular or flattened nut. In the sorrels the flowers are often unisexual.

Few parts of the world are unacquainted with the *Polygonaceæ*. In the northern hemisphere they occupy every meadow in the shape of sorrels, and every ditch and piece of waste ground as coarse docks and weedy persicárias, twining species of which latter creep into the cornfields to spoil the grain. Sorrel on the one hand, and rhubarb upon the other, may be taken as the representatives of their general qualities. In both of these oxalic acid is copiously formed; the stalks of rhubarb also contain abundance of malic acid, giving them their agreeable flavour when cooked. The roots are universally nauseous.

Twenty-nine species grow wild in England, sixteen of them near Manchester, referable to the two great sections or genera of docks and persicárias.

Sec. 1. The docks have a perianth of six divisions, three inner and three outer, the interior segments large, and the stigmas tufted. The stamens are uniformly six, and the flowers sometimes unisexual.

Sec. 2. The persicarias have the perianth in five nearly equal divisions, and the stigma undivided. Stamens five to eight.

- **A.—Leaves hastate, with acute angles; plant acid; flowers often unisexual.**
  - Stems two to three feet high, juicy; perianth-segments with tubercles on them .... 6. Meadow Sorrel.
  - Stems four to twelve inches high; perianth-segments without tubercles ..... 7. Sheep's Sorrel.
- **B.—Leaves more or less oval or lanceolate; never hastate at the base; plant never acid; flowers always bisexual.**
  - Leaves with flat or very slightly waved margins.
    - Segments of the perianth each with a tubercle on them.
      - Branches of the panicle erect, or nearly so ..... 1. Great Water Dock.
      - Branches of the panicle spreading ..... 4. Acute-leaved Dock.
    - Only one segment with a tubercle.
      - Branches of the panicle erect, or nearly so ..... 5. Common Broad-leaved Dock.
      - Branches of the panicle spreading ..... 3. Changeable Dock.
  - Leaves with strongly waved margins; panicle long and slender. Root yellow ..... 2. Wave-leaved Dock.

THE RHUBARB FAMILY.

Section 1.

A.—Stem twining, two to five feet long; leaves heart-shaped, pointed, flowers minute, greenish-white, in loose clusters ..... 11. Twining Persicaria.

B.—Stem not twining.

- Flowers axillary, two to three together, pinkish; stem much branched, half-procumbent, full of small knots; leaves lanceolate ..... 9. Knot-weed.
- Flowers in spikes or long-stalked clusters.
  - Stem branched, with numerous clusters or spikes of flowers.
    - Leaves triangular; stem nearly erect; flowers in loose clusters, prettily variegated with pink, green, and white ..... 10. Buckwheat.
    - Leaves oblong or lanceolate.
      - Spikes dense, cylindrical, 1—1½ inch long.
        - Ocrea fringed; pedicels and perianth smooth ..... 13. Red Persicaria.
        - Ocrea not fringed; pedicels and perianth rough, with glands ..... 14. Dock-leaved Persicaria.
      - Spikes thin and slender, 2—5 inches long.
        - Spikes drooping, greenish. Taste very acrid ..... 15. Water Pepper.
        - Spikes upright, reddish. Taste not acrid ..... 16. Small Persicaria.
  - Stem unbranched; spikes of flowers solitary, or rarely two.
    - Blade of the leaf decurrent on the stalk. Plant always on dry land ..... 8. Bistort.
    - Blade of the leaf not decurrent. Plant usually floating on water. 12. Amphibious Persicaria.

THE RHUBARB FAMILY.

Section 2.

HABITATS AND LOCALITIES.

1. Great Water Dock—(*Rúmex Hydrolápathum.*)

Stream and pondsides, rare. Near Rostherne Mere; Stakehill, and elsewhere about Middleton (Mr. John Turner); not uncommon about Boothstown, beyond Worsley. (J. E.) Fl. July, August.

E. R. xxx. 2104 (as *R. aquáticus*).

The largest of our native docks, growing from three to five feet high, and with the lower leaves sometimes eighteen inches long.

2. Crisp-leaved Dock—(*Rúmex crispus.*)

Roadsides and waste places, very common. Fl. June, July.

Curtis, i. 92; E. B. xxviii. 1998.

3. Changeable Dock—(*Rúmex sanguíneus.*)

Two states of this plant occur, one with green veins to the leaves, very commonly on ditch-banks and in shady places; the other with veins of a rich crimson colour, very rarely. The latter sprang up in abundance in a ploughed field close to Withenshaw Hall, in the autumn of 1858. It has been found also in Bredbury Wood, near Hyde; and at Culcheth, near Warrington. Fl. July.

E. B. xxii. 1563.

4. Sharp-leaved Dock—(*Rúmex acútus.*)

Ditch-banks and shady places, frequent. Fl. July.

Curtis, i. 166; E. B. xi. 724.

5. Common Broad-leaved Dock—(*Rúmex obtusifólius.*)

Roadsides and waste places, especially where moist, very common. Fl. July.

Curtis, i. 167; E. B. xxviii. 1998; Baxter, vi. 454.

This is the species of dock so useful for removing the pain of nettle stings when the juice of the leaves is rubbed in as an antidote.

6. Meadow Sorrel—(*Rúmex Acetósa.*)

Meadows and pastures, very common; often among mowing grass, giving the surface a fine crimson tinge, like the red light of the setting sun upon the sea. Fl. May, June.

E. B. ii. 127.

This is the plant commonly called "green-sauce," well known by the grateful acidity of its leaves and stalks.

7. Sheep's Sorrel—(*Rúmex Acetoséllа.*)

Dry pastures and hedgebanks, very common. Fl. May—July.

Curtis, ii. 321; E. B. xxiv. 1674.

The stalks and leaves often turn to a bright red in the decline of the year.

8. Bistort—(*Polygonum Bistórta.*)

Abundant in moist meadows on every side of Manchester. Very fine in Clayton Vale and at Gatley Carrs. Fl. May, June.

Curtis, i. 22; E. B. viii. 509; Baxter i. 5.

The leaves, boiled like spinach, make an excellent green dinner vegetable.

9. Knot-weed—(*Polygonum aviculáre.*)

Everywhere in waste ground. Fl. May—September. Annual.

Curtis, i. 27; E. B. xviii. 1252.

10. Buckwheat—(*Polygonum Fagopyrum.*)

Often among vetches sown as a crop, and occasionally in cultivated land, as a relic or descendant of plants similarly introduced. Frequently sown for the use of game. Very fine at Withenshaw in 1858. Fl. July—September. Annual.

E. B. xv. 1044.

This is the plant which yields the well-known "buckwheat flour," so valuable in northern latitudes.

11. Twining Persicaria—(*Polygonum Convólvulus.*)

Hedges and cornfields, common everywhere. When among grain, it binds the straws together as if with string, constituting one of the most mischievous kinds of "tares." Fl. July—September. Annual.

Curtis, ii. 249; E. B. xiv. 941.

12. Amphibious Persicaria—(*Polygonum amphíbium.*)

Ponds and lakes, frequent on the west, and in profusion in many places on the south-side of Manchester. The water at Lymm, especially at the upper end, is covered with floating islands of this charming aquatic, the pink flowers rising four or five inches above the surface. Fl. July, August.

As a terrestrial plant, plentiful near Northen Boat-house; about Eccles; and on the north-west border of Rostherne Mere, but seldom found in flower.

Curtis, ii. 248; E. B. vii. 436.

No English plant so well deserves the name of "amphibious." In September, 1857, I saw it growing in a dry hedge by the roadside between Southshore and Marton, its rosy cones intermingled with ripening blackberries, the water-plant forsaking its native element for high life, and forcibly bringing to mind Ovid's famous description of the Deluge:—"Fishes are caught among the elm-trees; dolphins get into the woods; they swim amid the boughs, and smite the sturdy oaks." (Met. i. 296.)

13. Common Red Persicaria—(*Polygonum Persicária.*)

Moist waste places, and on roadside heaps, abundant everywhere. Fl. August—October. Annual.

Curtis, i. 23; E. B. xi. 756.

14. Dock-leaved Persicaria—(*Polygonum lapathifólium.*)

Waste ground, and in cultivated fields, common, especially among potatoes. Fl. August—October. Annual.

Curtis, i. 24 and 25 (as *P. Pennsylvánicum*); E. B. xx. 1382.

The leaves both of this and the preceding species are frequently marked in the centre with a large purple spot.

15. Water Pepper—(*Polygonum Hydropiper.*)

Ditches and watery places, in profusion everywhere. Fl. August—October. Annual.

Curtis, i. 26; E. B. xiv. 989.

16. Small Persicaria—(*Polygonum minus.*)

Ditch-banks and marshy places about Timperley, Chorlton, and Jackson's Boat; also on Hale Moss and Lindow Common. Fl. September. Annual.

Curtis, i. 28; E. B. xv. 1043.

Rumex alpinus, the "monks' rhubarb," (E. B., Supp. i. 2694.) was formerly cultivated in this neighbourhood, as elsewhere, for the sake of its roots, which were used for the same purposes as the Turkey rhubarb, and is said to have naturalized itself at "Milnrow, near Oldham." (B. G.)

The tall crimson-flowered "Persicaria" of the gardens is *Polygonum Orientále*. Culinary or "French" sorrel is *Rúmex scutátus*. Besides these, and the universal rhubarb, so splendid when its vast cream-coloured panicles open their countless flowers, bulging out of curious sheaths, none of the Polygonaceæ are grown except by cultivators of the rare and peculiar. In their collections may sometimes be seen the *Oxyria renifórmis*, (E. B. xiii. 910.) a little sorrel, with kidney-shaped leaves, and a four-cleft perianth; the *Polygonum ochroleucum*, and the *Polygonum viviparum*, (Curtis, iii. 486.) an elegant alpine, remarkable for producing abundance of little bulb-like plants intermixed with its blossoms, which are white, and borne on a stem eight inches high. The most extensive and successful grower of rhubarb in our neighbourhood is Mr. Osbaldiston, of Baguley, whose acres are divided between this invaluable vegetable and the strawberry.

XXIII.—THE PASSION-FLOWER FAMILY. *Passiflorácea.*

Plants with very long, slender, half-shrubby stems, climbing, like the vine, by means of powerful axillary tendrils. Leaves alternate, fan-

Fig. 108.
Passiflora kermesina.

veined, generally with five or seven deep lobes, corresponding to the principal veins, and with stipules of considerable size and beauty.

Flowers simple, regular, pentamerous, usually two or three inches across, star-like, and of a fine crimson, blue, or purple; the five great stamens, ovary, and three-knobbed stigma elevated upon a pillar called a "thecaphore," almost peculiar to the family, and furnishing a ready means of recognition. Passion-flowers are also known immediately by the curious and beautiful coronet of coloured rays intermediate between the petals and the thecaphore, and which, in combination with the former, gives to these lustrous flowers the look of blended star-fishes and sea-anemones. In the *P. alâta*, where the rays are purple and barred, we seem to behold a captive *Actinia gemmácea*. The length of the thecaphore varies considerably in different species. It is longest perhaps in the *Passiflora kermesina*. (Fig. 108.)

The pride of South America and the West Indies, festooning every tree, and swaying by their tendrils in long pendants, Passion-flowers are to the forests of those favoured countries what ivy and honeysuckle are to the woods of England. Elsewhere there are but few, and scarcely any beyond the tropics; and consequently, with the solitary exception of the *P. cærûlea*, seen in gardens about Lymm and a few other places, their splendours are exclusively for the hot-house. Several mantle the walls and climb the iron supports in the conservatory at the Botanic Gardens. The large yellow egg-like fruit, called the "Granadilla," is the produce of the *P. quadrangulâris*. The *P. cærulea* and others produce a similar fruit, but smaller.

XXIV.—THE CARNATION FAMILY. *Caryophyllaceæ.*

Neat and often beautiful herbaceous plants, three inches to three feet high, for the most part slender and fragile, and very often glaucous. Stems thin and delicate, readily separable at the joints, and frequently forked. Leaves invariably opposite, simple, and entire; usually more or less oval or lanceolate, and pointed. Inflorescence in corymbs; flowers regular, generally pentamerous and star-like; petals often deeply cleft; stamens almost always ten, by deficiency sometimes five or four: ovary single, raised on a short stalk, or inserted in a ring, on which the petals and stamens are likewise placed; styles two to five, long, white, and slender, with the stigmas running along

the inner surface. Fruit a one-celled capsule, opening by twice as many teeth or valves as there are styles, with a free central placenta, and numerous seeds, the latter usually embossed with tubercles or embroidered with wavy patterns, and strikingly beautiful when magnified.

Fig. 109.
Rose Lychnis.

Over a thousand species are known, natives of the temperate and cold parts of both hemispheres, and often creeping to the very edge of perennial snows. Properties they can hardly be said to possess, being remarkable for little but insipidity. The only useful plant of the family is the soap-wort, which, when bruised and agitated in water, raises a lather like soap, available in some degree for washing.

Sixty grow wild in England, and twenty-four of them near Manchester, many being weeds and inconspicuous; but the larger kinds, especially the different species of Lychnis and Stellaria, contributing abundantly, in early summer, to the floral gaiety of our woods and hedgerows. The white Lychnis and the rose Lychnis are remarkable for their unisexual flowers. As with other families, they may be divided into white-flowered and red-flowered. The former immensely preponderate; and though white varieties of the second section appear occasionally, others of the normal colour are always close by, and shew to which division they really belong.

Section 1.—FLOWERS INVARIABLY WHITE.

A.—*Sepals united into a bag-like calyx.*

Flowers bisexual; styles three. Calyx remarkably inflated, smooth, whitish, beautifully veined with purple and green; whole plant glaucous ..... 1. Bladder Campion.

Flowers unisexual; styles five. Stems stout, rather downy; leaves egg-shaped ..... 5. White Lychnis.

B.—*Sepals separate, or only very slightly united at the base.*

* Leaves thread-shaped, cylindrical.

Sepals and petals usually four each, rarely five; stamens four, rarely ten.

Plant prostrate, glabrous, perennial ..... 18. Common Pearl-wed.

Plant erect, slightly hairy, annual ..... 19. Annual Pearl-wed.

Sepals and petals usually five each; stamens five to ten.

Petals shorter than the calyx. Plant six to eight inches high ..... 20. Corn Spurrey.

Petals twice as long as the calyx ..... 21. Dwarf Spurrey.

** Leaves flat, lanceolate or egg-shaped.

Petals not in the least divided.

Parts of the flower in fours; flower usually solitary.. 17. Mœnch's Flower.

Parts of the flower in fives; flowers numerous.

Leaves petiolate, three-ribbed..... 22. False Chickweed.

Leaves sessile, without ribs. Plant stiff and shrub-like ..... 24. Thyme leaved Sandwort.

Petals more or less deeply cleft.

Styles three.

Leaves egg-shaped or heart-shaped; lower ones on stalks.

Petals shorter than the calyx ..... 11. Chickweed.

Petals twice as long as the calyx ..... 9. Broad-leaved Wood Stitchwort.

Leaves linear or lanceolate, sessile.

Plant growing in wet ditches, annual, trailing.. 10. Bog Stitchwort.

Plant growing in dry places, perennial, upright.

Petals not longer than the calyx ..... 8. Small Stitchwort.

Petals twice as long as the calyx ..... 7. Satin-flower.

Styles five; plant hairy, and often clammy.

a. Petals twice as long as the calyx; leaves narrow-lanceolate ..... 16. Field Mouse-ear.

b. Petals half as long again as the calyx; leaves heart-shaped, sessile..... 12. Water Mouse-ear.

c. Petals shorter than the calyx, or about as long.

Leaves broadly egg-shaped, almost round.... 13. Common Mouse-ear.

Leaves long and narrow.

Stamens usually five..... 15. Least Mouse-ear.

Stamens usually ten..... 14. Sticky Mouse-ear.

SECTION 2.—FLOWERS RED, CRIMSON, OR PINK.

Stems prostrate, with very numerous and close joints, and white stipules ..... 23. RED SANDWORT.
Stems upright.
Styles two; leaves sessile ..... 2. SOAP-WORT.
Styles five.
Calyx much longer than the petals ..... 3. CORN-COCKLE.
Calyx shorter than the petals.
Leaves oblong, egg-shaped; petals cleft in two; flowers unisexual. (Fig. 109.) ..... 4. ROSE LYCHNIS.
Leaves narrow and linear; petals cleft into four lobes ..... 6. CUCKOO-FLOWER LYCHNIS.

HABITATS AND LOCALITIES.

1. BLADDER CAMPION—(*Silène inflàta.*)

Cornfields and waysides, rare. Eccles, Marple, Timperley (near the Station), Prestwich, Agecroft, Berryfield, near Tyldesley (J. E.), and on the way from Sale to Carrington Moss, but always sparingly. Fl. June—August.

E. B. iii. 164 (as *Cucúbalus Béhen*).

The beautiful and unique calyx of this plant is at once sufficient to determine it.

2. SOAP-WORT—(*Saponária officinàlis.*)

Plentiful, from time immemorial, on the banks of the Medlock, between Clayton Bridge and Ardwick, and on the banks of the Irwell at Barton. Found also west of Prestwich, near Northen, Tyldesley, Boothstown (J. E.), and on the river bank in Marple Vale. Fl. July, August.

Curtis, i. 102; E. B. xv. 1060; Baxter, i. 37.

3. CORN-COCKLE—(*Agrostémma Githágo.*)

Cornfields, especially right and left of the Bowdon Railway, and at Lymm, bringing its purple flowers to a level with the young ears of grain. Often appears also among vetches. Fl. June, July. Annual.

Curtis, i. 172; E. B. xi. 741; Baxter, iii. 175.

This species again is distinguished by its calyx, the slender lobes of which are more than twice the length of the petals, and clothed, like every other part of the plant, with silky hairs. A white variety is occasionally met with.

4. Rose Lychnis—(*Lychnis dioica.*)

Hedgebanks and shady lanes, everywhere. Plentiful also in damp woods, of which it forms one of the most striking decorations in May and June, as soon as the blue of the forget-me-not has faded. The woods at Styal and about Baguley are perfectly crimsoned with it. It often opens a flower as early as April, and is sometimes found white.

Curtis, i. 105; E. B. xxii. 1579.

Doubled by the art of the gardener, it makes a good and frequent border flower.

5. White Lychnis—(*Lychnis vespertina.*)

Fields and hedgebanks on the South and South-west, plentifully disseminated, though nowhere in masses like the preceding. Very fine and conspicuous about Sinderland, between Bowdon and Carrington Moss. Fl. June—August.

E. B. xxii. 1580 (as *Lychnis dioica, flore albo*).

The stamen and pistil-bearing flowers of these two species are readily distinguished, without taking the trouble to open them, by simply compressing the calyx between the fingers, when, if it be a female flower, the ovary will be felt, solid and round, whereas in the male flower there is no resistance. They may be told by the very look of the calyx, which the presence of the ovary renders bulging and ovate in the female, while in the male it is narrow and contracted. In both species the female plant is usually taller and more robust, but with fewer blossoms than the male, and though seldom distant many yards, rarely grows intermingled with it. No plants better shew the structure of a capsule and free central placenta; and as they ripen seeds abundantly, it is easy to procure specimens.

The white-flowered variety of the *dioica* may be distinguished from the *vespertina* by the reflexed teeth of the capsule, those of the latter being erect. Moreover, the flowers of the *dioica* are open all day, but those of the *vespertina* do not expand fully until evening.

6. Cuckoo-flower Lychnis—(*Lychnis Flos-cuculi.*)

Moist places in old meadows, and on the borders of ponds, where the ground is saturated with wet, and the summer vegetation is rich and various, common. Fl. June.

Curtis, i. 33; E. B. viii. 573; Baxter, i. 71.

The pretty and delicate pink flowers, which always have a torn and tattered look, are in perfection just before hay-making, or when the cuckoo is in full cry, and quiver till the scythe of the mower comes, after which they are seldom seen in plenty. A white variety is met with now and then. It is difficult to carry home either before they wither.

7. Satin-flower—(*Stellária holóstea.*)

Hedgebanks everywhere in early summer, decking them with innumerable white stars that look like snow.

Curtis, i. 103; E. B. viii. 511.

About Cheadle this plant is called "Breakbones," from the readiness with which the joints of the stem come apart. It is remarkable alike for the profusion of its bloom, the brilliant purity of its elegantly ribbed and recurving white petals, against which the ten pretty yellow anthers shew conspicuously, and for the grassy look of its herbage. The latter, instead of disappearing in the winter, as happens with most perennial wild-flowers, lingers straggling about the hedge-banks, and sprouts with the first steps of the opening spring. The leaves are smallest at the base of the stem, where they are often not more than three quarters of an inch long, and gradually enlarge upwards, becoming at last two inches or more in length.

8. Small Stitchwort—(*Stellária graminea.*)

Grassy and bushy places, everywhere, growing amidst stronger plants, delighting in their shelter, and running up prettily among their branches, especially those of gorse, being weak and brittle, and unable to stand erect. Fl. May—July.

E. B. xii. 803.

9. Broad-leaved Wood Stitchwort—(*Stellária némorum.*)

Banks of rivers where shaded by trees, frequent. Plentiful beyond Agecroft, bordering the Irwell and the little streams that strengthen its current. Fl. May, June.

E. B. ii. 92; Baxter, ii. 154.

Plants growing on river-banks are generally concurrent with them, their seeds and roots being washed along by floods, and deposited as the water subsides.

10. Bog Stitchwort—(*Stellária uliginósa.*)

Wet shady ditches, common. Fl. June. Annual.

Curtis, ii. 392: E. B. xv. 1074.

11. Chickweed—(*Stellária média.*)

Everywhere, and in blossom always. Annual.

Curtis, i. 20 (as *Alsine média*); E. B. viii. 537.

A most variable plant, but distinguishable, under every diversity of aspect, by a ridge of white hairs running down the internodes, and shifting at every joint to the opposite side. The Germander-speedwell is known among the Veronicas by a similar feature.

12. Water Mouse-ear—(*Cerástium aquáticum.*)

Moist ditch-banks and swampy places, rare. Between Chorlton and Jackson's Boat (1858); in a little ravine in Bredbury Wood; and between Worsley and Astley. (J. E.) Fl. July.

Curtis, i. 34; E. B. viii. 538.

13. Common Mouse-ear—(*Cerástium vulgátum.*)

Waste places. Pretty general in all that part of Cheshire which lies between the Mersey and the limits of the Manchester Flora. Plentiful between Bowdon and Rostherne. Fl. summer. Annual.

Curtis, i. 107; E. B. xi. 789.

14. Sticky Mouse-ear—(*Cerástium viscósum.*)

Waste and cultivated ground, very common. Fl. summer. Annual.

Curtis, i. 108; E. B. xi. 790.

15. Least Mouse-ear—(*Cerástium semidecándrum.*)

Dry, poor, open situations, not uncommon. Kersal Moor. Fl. spring. Annual.

Curtis, i. 106; E. B. xxiii. 1630.

16. Field Mouse-ear—(*Cerástium arvénse.*)

Fields and dry gravelly places, rare. Railway slopes near Rochdale. (J. P.) Wharton Hall, Little Hulton, plentiful. (G. H.) Fl. summer months.

Curtis, ii. 393; E. B. ii. 93.

17. Mœnch's Flower—(*Mœnchia erécta.*)

In the lane between Worsley and Boothstown, abundant. (J. E.) Fl. May, June. Annual.

Curtis, i. 84 (as *Sagina erecta*); E. B. ix. 609; Baxter, vi. 460.

The flowers, like those of many other of the smaller plants of this family, open only in sunshine.

18. Common Pearl-weed—(*Sagina procúmbens.*)

At the bottom of shaded walls; in poor and grassy pastures; on garden paths, where it is often a troublesome weed, &c.; common everywhere. Fl. all summer. Annual; sometimes perennial.

Curtis, i. 157; E. B. xiii. 880; Baxter, iii. 199.

The calyx spreads out flat when the capsule is ripe, and holds it like a cup in a saucer.

19. Annual Pearl-weed—(*Sagina apétala.*)

Walls near Marple; Rose Hill, Bowdon; and garden-walks at Prestwich and Sedgley, plentiful. Fl. summer. Annual.

Curtis ii. 306; E. B. xiii. 881.

20. Corn Spurrey—(*Spérgula arvénsis.*)

Cultivated ground, especially cornfields, wherever the soil is sandy. Plentiful at Prestwich, and about Bowdon and Lymm. Fl. June, July. Annual.

Curtis, ii. 323; E. B. xxii. 1535; Baxter, v. 388.

21. Dwarf Spurrey—(*Spérgula nodósa.*)

Wet, sandy, and boggy places, but rare. Hale Moss. Borders of Rostherne Mere. Pond-sides at Baguley. Canal banks below Worsley Hall. About Middleton, in two or three places. (Mr. John Turner.) Fl. July, August.

Curtis, ii. 254; E. B. x. 694.

22. False Chickweed—(*Arenária trinérvia.*)

Damp and shady hedgebanks, frequent. Fl. May, June. Annual.

Curtis, ii. 251; E. B. xxi. 1483.

23. Red Sandwort—(*Arenária rúbra.*)

Sandy lanes and commons, rather rare. Hough End; Hale Moss; Monton Green; Kersal Moor; Bowdon; Knutsford race-ground. Frequent about Stockport. Fl. June—August. Annual.

E. B. xii. 852.

24. Thyme-leaved Sandwort—(*Arenária serpyllifólia.*)

Walls and dry, sandy places, and sometimes in cornfields, but very unusual. On Clifton Aqueduct, annually; Rainsall, and at Bowdon. Fl. July. Annual.

Curtis, ii. 252; E. B xiii. 923.

The cultivated *Caryophyllaceæ* partake much of the character of the wild Lychnis, one of the handsomest, the refulgent "scarlet," with petals of fire, belonging to the same genus. Rose-campions, *Silénes* of different species, and *Gypsóphilas*, are not infrequent, while the most charming of the family are universal. These are the sweet-william, nature's play-ground of red and white; the pink, the Indian pink, and the spicy carnation. The pink and carnation are generally double, and in numerous varieties, especially the latter, of which there

are three principal kinds, namely, the Clove carnation, the deep rich crimson unvariegated flower; the Bizarre carnations, with the petals streaked, spotted, and blotched over their whole surface; and the Picotees, in which the petals are white, but with a fringe of coloured lines along the margin.

XXV.—THE PURSLANE FAMILY. *Portulacáceæ.*

Pretty little herbaceous plants, resembling the Carnation Family in most points, but distinguished by having only two sepals instead of five, and by a strong tendency to succulence. They are scattered all over the world, but sparingly, and in the British Flora are only known in the "blinks" or *Móntia fontána*, a minute, densely-tufted plant, with tiny white flowers, drooping at first, and composed of five petals, three of which are smaller than the others, three (or rarely five) stamens, and three stigmas, the English name derived from the sensitiveness of its blossoms to the light.

HABITATS AND LOCALITIES.

By water-courses on all the hills in the district; also on Hale Moss; and plentiful and fine at Irlam. (J. S.) Fl. June. Annual.

Curtis, i. 153; E. B. xvii. 1206.

On rockeries there is often seen a pretty little plant, with spoon-shaped leaves and lilac flowers, called *Claytónia;* and in the open borders occasionally, different species of the showy genus *Calandrínia*, succulent, and with flowers remarkably sensitive to the light.

XXVI.—THE FUMITORY FAMILY. *Fumariáceæ.*

Delicate herbaceous plants, with slender and often scrambling stems, frequently succulent and half-transparent with watery juice; the leaves usually alternate, much divided and cut, like parsley, and in the scrambling species often tendrilled. Flowers in racemes, red, pink, yellow, or white; the parts in twos or fours, but very irregular in shape, and distinguished by the lateral petals cohering at their tips, and forming with them a kind of little pouch. They have also a protuberance at the base, and the flower is often remarkably flat. Stamens six, combined in two sets of three each; pistil solitary; stigma with two blunt lobes, and nestling among the anthers in the pouch. Fruit a round or oblong capsule, one or few-seeded.

A small and unimportant family, but interesting from the singular conformation of the flowers. The species belong chiefly to the temperate latitudes of the northern hemisphere.

Six grow wild in England, and three of them near Manchester.

A.

Leaves ending in branched tendrils; seed-pod oblong, flattened, and with several seeds.

1. Flowers pale-yellow, very minute..... } LITTLE CLIMBING FUMITORY.

B.

Leaves without tendrils; seed-pod globular, and one-seeded.

2. Stem erect, generally scrambling by the help of its twisted leafstalks; sepals large, oval, twice as long as the seed-pod; flowers whitish flesh-colour, with purple tips; six to twelve in a raceme; foliage yellowish-green ..... } RAMPANT FUMITORY.

3. Stem erect, spreading, not scrambling; sepals small, acute, not longer than the seed-pod; flowers bright pink, with deep red tips, fifteen or twenty in a raceme; foliage glaucous ..... } COMMON FUMITORY.

HABITATS AND LOCALITIES.

1. LITTLE CLIMBING FUMITORY—(*Corydális claviculáta.*)

Not infrequent in damp hedges, especially near and upon moorland, scrambling, by the help of the bushes, to the height of a yard or more. Plentiful on Hale Moss, in the neighbourhood of Carrington Moss, and in the lane leading from Irlams-o'th'-Height to Agecroft. Fl. June, July. Annual.

E. B. ii. 103 (as *Fumária claviculata*).

2. RAMPANT FUMITORY—(*Fumária capreoláta.*)

Common in hedges and in cultivated land, especially in the district between Bowdon and Wilmslow, and a common weed about Ashton-upon-Mersey. Fl. summer and autumn. Annual.

Curtis, ii. 411; E. B. xiv. 943.

The petioles curl like tendrils, and thus answer the same purpose, so various is nature in her resources.

3. COMMON FUMITORY—(*Fumária officinális.*)

Abundant in similar situations, and diffused plentifully over the same area as the preceding. Fl. May—November. Annual.

Curtis, i. 125; E. B. ix. 589; Baxter, iv. 278.

Though a troublesome and persevering weed, fumitory is an indication of good and productive land, hastening, like the poppies, to occupy newly-turned-over soil. It flourishes most in autumn, improving in its light and airy beauty every day after the corn is cut, and is never so charming as when its rosy clusters and fragile stems and foliage are wet with the dews of an October morning.

The yellow fumitory (*Corydális lútea*, E. B. ix. 588), a neat, bushy little plant, is common upon rockeries; the *Dielytra formósa*, a plant growing in dense tufts, with glaucous foliage, and clusters of pendulous pink flowers on stems a foot high, produced continuously from May to winter, is found in almost every suburban garden, bearing the smoke complacently, and content to live in any kind of soil; and the *Dielytra spectábilis* in almost every suburban green-house. This lovely plant is immediately known by its arching sprays of rose-tinted flowers, hanging from the stalk like bells, and as flat as if they had been pressed in a book. *Corydális bulbósa*, with dull purple flowers in March and April, and the climbing *Corydális scándens*, are also common.

XXVII.—THE BERBERY FAMILY. *Berberideæ.*

If we take only the shrubby species of this curious family, none are more easily described. They are the only shrubby Exogens with the parts of the flower in *sixes*. Individually the flowers are the size of a small pea, globular when closed, cup-shaped when open, of a lively yellow colour, and honey-scented. Sometimes they grow singly, on long peduncles; more frequently in panicles or racemes. The stamens are remarkable for their excitability. Reclining each in the concavity of a petal, if touched with a needle they spring up, like those of the *Kálmia*, and bring the anthers into close company with the stigma. After a time, they slowly return to their first position. The stems are generally beset with sharp thorns; or if thornless, then the leaves, which are either simple or pinnate, have prickly edges. When ripe, the solitary ovary becomes a scarlet or purple berry. The species are diffused through the temperate countries of the northern hemisphere, a few more occurring in those of the southern.

The other section comprises herbaceous plants of altogether different aspect, but, with a single exception, scarcely ever seen in a growing state. They would be better regarded as a distinct family, and called *Nandineæ*.

One of each division is indigenous to our island, but the true berbery alone to the neighbourhood of Manchester. This, the *Berberis*

vulgáris, is a bushy shrub, three to six feet high, with abundance of slender twigs, simple and oval leaves with fine serratures, numerous three-cleft thorns, and pendulous racemes of yellow flowers, succeeded by scarlet berries, the size and shape of a grain of rye, agreeably acid, and excellent for jam.

HABITATS AND LOCALITIES.

Plentiful in hedges near Congleton and Peover; also in hedges at Prestwich, near Middleton, and beyond Jackson's Boat, on the way to Baguley. Formerly it was much more plentiful, but the herb-doctors have destroyed it for the sake of the roots, which are reputed a cure for the jaundice. (J. S.) Fl. June. Fruit in September.

E. B. i. 49; Baxter ii. 115.

Frequent in gardens.

The commonest foreign species is the *Mahónia pinnáta*, a low-growing shrub with pinnate, thorny-edged, evergreen leaves, and dense, sessile panicles of yellow flowers, opening with the first steps of spring, and followed by clusters of purple berries, resembling little grapes. The herbaceous *Epimédium alpinum*, (E. B. vii. 438.) a very elegant plant, with twice-ternate leaves, the leaflets oblique and drooping, occurs in curiosity-gardens.

XXVIII.—THE GRAPE-VINE FAMILY. *Vitáceæ* or *Ampelideæ*.

Shrubs with long and slender stems, climbing by means of axillary tendrils. Leaves petioled, simple, and undivided, or fan-lobed, or palmate, and even quinate. Flowers green and minute, regular and pentamerous; stamens five; pistil solitary, ripening into an oval or globular berry. Inflorescence in panicles or umbels. A few exceptions occur to these characters, but not in ordinary Botany.

The species, which number between two and three hundred, are natives of the milder and warmer parts both of the eastern and the western hemisphere, and especially of India, but none are indigenous to Europe. The birth-place of the grape itself, that good Samaritan of the kingdom of plants, and most illustrious tree in nature, appears to be the shores of the Caspian Sea, in latitude 37°. Though often grown out of doors in the neighbourhood of Manchester, the grape seldom ripens fruit worth eating. Unless provided with artificial shelter, the berries rarely differ much in appearance from green peas; the hindering nights of autumn chill their sap, and we have to look

into the hot-house, where what is nearly hopeless in the open air is compensated a thousand-fold by the skill of our gardeners, whose magnificent bunches are nowhere surpassed in England. The best grapes I have seen ripen in the open air grew at Hazle Grove in 1858, a year, like 1842, remarkable for the wealth of its autumnal products, both cultivated and wild. Next in interest to the vine comes the Virginian-creeper, or *Ampelopsis hederácea*, now so common as a summer tapestry for walls, even in the streets. Though deciduous, it is a great recommendation to this plant that in a year or two it will cover many square yards of desolate wall with its handsome quinate leaves, unassisted by training or nailing, and that in the autumn it assumes a fine red, which mingles admirably with the polished green of ivy. The tendrils of the Virginian-creeper, instead of curling spirally, spread themselves out flat, like an expanded hand, every little finger putting forth an adhesive sucker at the tip, by which it cements itself firmly to the wall. A third plant of the family, common in green-houses, is the *Cissus discolor*, very slender in the stems, and with large, oval, pointed, velvety leaves, puce-coloured below, and on the upper surface most beautifully flushed with gray and crimson.

XXIX.—THE ORANGE FAMILY. *Aurantiáceæ.*

Trees immediately known by their leaves, which are large, alternate, oval, pointed, smooth, and full of translucent dots, *the lamina articulated with the petiole.* Flowers white and fragrant, and giving birth to the orange, the lemon, the citron, the lime, the shaddock, and other delicious fruits of similar nature. These precious trees are natives of the East Indies, but have been carried to every country in the world that is either warm enough for their culture out of doors, or can supply them with the shelter of a crystal palace. The common orange is the *Citrus Aurántium.*

XXX.—THE SUMACH FAMILY. *Anacardiáceæ.*

A family of exotic trees, many of great beauty and value, and interesting at present as containing the Sumach, of which two kinds are commonly found in Manchester gardens. The best known is a

tree of moderate size, with noble pinnate leaves, downy stalks, and a large dense panicle of crimson flowers, appearing in August. This is the *Rhus typhina*, or Stag's-horn Sumach. The other, or Venus Sumach (*Rhus Cotinus*), is a shrub, with obovate, entire, long-stalked leaves, and loose panicles of greenish-yellow blossoms. The flowers of both species are unisexual.

XXXI.—THE SUNDEW FAMILY. *Droseráceæ.*

Very curious and elegant little plants, growing upon wet moors in almost every part of the world, and abundantly in Britain. Leaves all radical, in the native species fringed and clothed upon the upper

Fig. 110.
Round-leaved Sundew (leaves in part left plain).

Fig. 111.
Leaf of Great English Sundew.

surface with delicate hairs resembling pink eye-lashes, only that instead of tapering to a point they are tipped with oval glands, from which, in summer, exude drops of limpid gum, decking the plant

with vegetable diamonds. Flower-stalk from the bosom of the leaves, three to six inches high, and bearing an incurved, and sometimes branched raceme of minute white blossoms, which are raised at intervals of a day or two, one by one, to the apex of the arch, where they open, provided the sun shines, and not else. Corolla regular and pentamerous; stamens and pistils five to eight. The native species are the only members of the family ever seen alive in this country, except rarely, in very choice green-houses, the Venus, Fly-trap or *Dionæa muscipula*. In properties they are acid and acrid.

Three species are indigenous, and the whole of them found near Manchester.

1. Leaves circular, lying flat on the ground, in a rosette two or three inches in diameter. (Fig. 110.) ..... } ROUND-LEAVED SUNDEW.

2. Leaves narrow, five or six times as long as broad, widening from the base upwards, and erect. Seeds with a loose, chaffy coat. (Fig. 111.) ..... } GREAT ENGLISH SUNDEW.

3. Leaves oblong, three or four times as long as broad, and erect. Seeds with a rough, not chaffy, coat ..... } SMALL SUNDEW.

HABITATS AND LOCALITIES.

1. ROUND-LEAVED SUNDEW—(*Drósera rotundifólia.*)

On all the moors and mosses about Manchester, sitting chiefly on moist green cushions of *Sphagnum*, in little hollows among the heather, but sometimes more exposed, and then visible at a long distance through its redness. Plentiful and easily procurable upon Lindow Common, Hale Moss, and Barton Moss. Fl. July, August.

Curtis, iv. 601; E. B. xiii. 867 (mislettered *D. longifolia*); Baxter, iii. 201 (drawn too large).

2. GREAT ENGLISH SUNDEW—(*Drósera Anglica.*)

In similar situations; less frequent than the round-leaved sundew, but commoner than the next. Exceedingly fine and abundant on Carrington Moss, and easily procurable. Fl. July, August.

E. B. xiii. 869.

3. SMALL SUNDEW—(*Drósera longifólia.*)

In similar situations, but seldomer. Carrington Moss, Chat Moss, Barton Moss. Fl. July, August.

Curtis, iv. 602; E. B. xiii. 868 (mislettered *D. rotundifólia*)

These strange little plants are in perfection from the end of June to near the middle of August, when no one interested in the marvels of nature should fail to look for them. It is best to go after a week of dry weather, unless indifferent to the possibility of a shoeful of water. Flies and midges are captured by the viscid drops on the points of the hairs, as birds are caught with bird-lime, and held fast till they are dried to death by the sun, appearing to furnish nourishment to the plant in the products of the decomposition of their corpses. See "Manchester Walks and Wild-flowers," chap. x.; also "Life, its Nature," &c., p. 39, Ed. 2.

XXXII.—THE RUE FAMILY. *Rutáceæ.*

Shrubs, with the exception of the *Fraxinélla*, and in every case exotic. Leaves opposite or alternate, usually covered with pellucid, resinous dots, and emitting a powerful and aromatic odour. Parts of the flower in fours or fives; style simple; stigmas as many as the cells of the ovary, and the fruit invariably capsular. The ordinary representative of the family is the common rue (*Rúta gravéolens*), easily distinguished by its blueish-green, doubly-pinnatifid leaves, intensely bitter taste, combined with disagreeable smell, and yellow flowers, with the parts in fours. Next to it in frequency are the favourite green-house shrubs called *Corréa*, *Borónia*, and *Diósma*, mostly from New Holland and the Cape of Good Hope. The Fraxinélla, a plant with leaves like those of the ash-tree, and tall racemes of large, irregular pink flowers, that seem to concentrate the perfumes of all the spice islands, is not rare in superior gardens. The perfume only lasts an hour or two after the stem is broken.

XXXIII.—THE ELATINE FAMILY. *Elatináceæ.*

Extremely minute plants, allied to the Carnation Family, but differing in their capitate stigmas, and ovary of three or more cells. They occur throughout the northern hemisphere, inhabiting marshes, and the borders of lakes and ponds.

Two species grow wild in England, and one of them, the common elatine, near Manchester, a minute aquatic, with stems in matted, creeping tufts, half-an-inch to two inches long; the flowers trimerous and rose-coloured.

HABITATS AND LOCALITIES.

COMMON ELATINE—(*Elátine hexándra.*)

Borders of Mere Mere, near Rostherne. Fl. July, August. Annual.

E. B. xiv. 955 (as *E. Hydropiper*); Baxter, vi. 487.

The real *E. Hydropiper* has tetramerous flowers, and is figured in E. B., Supp. i. 2670.

XXXIV.—THE MILKWORT FAMILY. *Polygaláceæ.*

Under-shrubby or herbaceous plants, with leaves for the most part simple, lanceolate, oval or triangular, entire, and always without stipules. Flowers irregular and various. Those of the ordinary kinds resemble the blossoms of the pea, but are provided with a curious crest-like appendage, which, taken along with the exstipulate leaves, serves at once to distinguish them from the Pea Family, and as a ready personal characteristic for themselves. The family is rather extensive, scattered all over the world, and remarkable for various medicinal properties, bitterness predominating. The only English species belongs to our own Flora,—the common milkwort, a pretty little herbaceous plant, with slender, more or less procumbent stems, upright when among long grass, three to six inches high, clothed with narrow, lanceolate leaves, and terminating in a raceme of deep blue flowers, which occasionally vary to white or pink.

HABITATS AND LOCALITIES.

Moors, waysides, and dry, hilly pastures, frequent. Tandle Hill, near Middleton. Abundant on Hale Moss, where Mr. Hunt finds also the variety *depressa*. Fl. June, July.

E. B. ii. 76; Baxter, iv. 251.

Polygala chamæbúxus, a diminutive shrub, from the Alps, with yellow purple-tipped flowers, appearing in March and April, is common in gardens: and in green-houses there are many beautiful Cape species of the same genus, with large pea like crimson flowers, and conspicuous crest of paler hue.

XXXV.—THE BLADDER-NUT FAMILY. *Staphyleáceæ.*

A small family of ornamental shrubs, represented near Manchester by the principal species, the common bladder-nut, or *Staphyléa pinnáta*, included in almost all the British Floras, but a native properly of Central and Eastern Europe, and in England only a runagate from cultivation. Its large, pinnate, elder-like leaves, opposite and stipulate, and beautiful pendulous clusters of regular, pentamerous white flowers, resembling chandeliers, and appearing in May, instantly distinguish it from every other inmate of the garden. Individuals occur at Worsley; near Newbridge hollow, beyond Bowdon; on the road between Cheadle and Stockport, and in the belt of shrubbery before Didsbury College. It attains the height of about ten feet.

E. B. xxii. 1560; Baxter, iii. 198.

XXXVI.—THE HORSE-CHESNUT FAMILY. *Sapindáceæ.*

A family for the most part stately and aristocratic, various in value and properties, widely diffused in India and South America, but altogether extra-European, and in England scarcely known except in

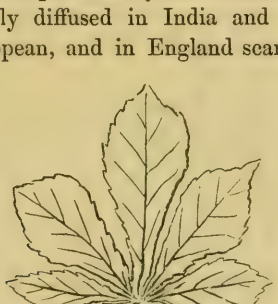


Fig. 112.
Leaf of Horse-chesnut.

the horse-chesnut itself,—*Æsculus Hippocástanum*,—that magnificent tree, whose noble septate leaves and superb pyramids of white blossoms, flushed, like sea-shells, with pink and yellow, and lighting up

every bough to the topmost pinnacle of the glorious fabric, as if with lamps for some jubilee or royal gala, supply one of the most imposing spectacles in nature. The large, smooth, shining, mahogany-coloured seeds, as they drop in October from the prickly capsules, are no less beautiful in their kind than the flowers and foliage. No tree expands its leaves more rapidly, or furnishes a finer example of a bud. The noblest horse-chesnut near Manchester, that I am aware of, stands by the wayside between Singleton and Besses-o'th'-Barn, on the right hand, and is called, because of its magnitude, by the people of the neighbourhood, the "Great Tree." The small red-flowered species, occasionally seen in plantations, but not often blossoming, is the *Æsculus Pávia*. The flowers of both are in perfection about the middle and end of May.

XXXVII.—THE MAPLE FAMILY. *Acerácea.*

A small family of trees, confined to the northern hemisphere, and remarkable, in several instances, for their sugary sap, and light and

Fig. 113.
Leaf of Acer.

Fig. 114.
Fruit of Acer.

useful timber. The beautifully mottled wood, called "bird's-eye maple," is well known in drawing-rooms, and "maple sugar" to every one who is informed concerning the productions of New Bruns-

wick. Leaves opposite, simple, fan-veined, fan-lobed, and upon long petioles; flowers small, green, or greenish-yellow, collected plentifully in axillary racemes or corymbs, with (in the common kinds) usually eight stamens, placed upon a thick and flattened ring beneath the ovary, which is two-lobed, and curved like a earwig's opened pincers. The fruit consists of two small, roundish, one-seeded carpels, lengthened at one extremity into a thin, dry wing, and while young, often of a pretty rose-colour. (Fig. 114.) Sometimes there are three carpels, when the fruit resembles the arms of the Isle of Man.

Fig. 115.
Sugar Maple.

Two species occur in England, one truly wild, the other properly a native of the mountains of Central Europe and Western Asia, but now nearly naturalized, and both found near Manchester.

1. Flowers in long pendulous racemes; lobes of the leaves large, pointed, and serrated ..... } Sycamore.

2. Flowers in erect corymbs; lobes of the leaves obtuse, entire, or a little crenate ..... } Common Maple.

HABITATS AND LOCALITIES.

1. Sycamore—(*Acer pseúdo-plátanus.*)

Everywhere in plantations and hedges; the most abundant and flourishing tree of the district, but scarcely spontaneous in any case. Fl. May, June.

E. B. v. 303.

2. Common Maple—(*Acer campéstre.*)

In hedges, but for the most part as a scraggy bush, rather than the handsome round-headed tree it becomes in parts of the country more congenial to its taste. Pennington, near Leigh; Bedford; Gorton; on Werneth Lowe; and on the banks of the Goyt, below Strines, ripening fruit every autumn. Occasionally in shrubberies. Fl. May, June.

E. B. v. 304; Baxter ii. 98.

Two or three North American *Acers* occur in plantations, especially the true sugar maple, or *Acer saccharinum*, of which there are some handsome and freely flowering specimens by the banks of the canal between Clifton and Salford. Fig. 115 shews the form of the leaves and fruit.

XXXVIII.—THE SPINACH FAMILY. *Chenopódeæ.*

Herbaceous or under-shrubby plants, weedy in habit, one to three feet high, closely resembling the Amaranth Family in structure, but seldom aspiring to their beauty. The flowers consist only of a calyx, which is generally five-lobed, regular, and persistent, with usually five stamens, a single ovary, and a solitary seed. They are frequently unisexual, and almost always green, minute, and insignificant, the inflorescence in axillary or terminal spikes or panicles. Some species have a tendency to extend the perianth, after flowering, into horizontal wings, which gives them a very peculiar look; while others secrete abundance of coloured juice in their sepals, the number and closeness of these parts making the stalks appear clothed with sessile strawberries. This is particularly conspicuous in the strawberry-blite, or *Blitum virgatum*, one of the favourite curiosities of Lancashire botanists.

Chenopodeæ are exceedingly common in all the northern parts of Europe and Asia, and in several cases supply wholesome articles of food, as spinach, in its leaves, and the beet, in its great red root, famous as the principal source of sugar to the French. Carbonate of soda, in the crude condition called Barilla, is yielded in immense quantities by the seaside-haunting species, which are numerous, and a few are accounted serviceable as medicines.

Twenty-five species grow wild in England, and seven of them near Manchester.

- A.—Flowers bisexual; female perianth scarcely enlarged when in fruit.
  - Leaves toothed, angled, or lobed.
    - Leaves green on both surfaces, arrow-shaped, triangular, and acuminate ..... 1. Perennial Goose-foot.
    - Leaves with a white powder on the under surface.
      - Leaves ovate, inclining to rhomboid, somewhat toothed ..... 2. White Goose-foot.
      - Leaves triangular, toothed, and serrated. Plant either green or of a fine red colour ..... 3. Red Goose-foot.
  - Leaves ovate, undivided, and entire.
    - Leaves green on both surfaces, pointed ..... 4. Sharp-leaved Goose-foot.
    - Leaves with white powder on the under surface, greasy to the touch, and detestably fœtid ..... 5. Fœtid Goose-foot.
- B.—Flowers unisexual; female perianth, when in fruit, with two much enlarged segments.
  - Leaves broadly triangular or hastate, glabrous, and irregularly toothed. Branches of the stem long and straggling ..... 6. Common Orache.
  - Leaves mostly lanceolate. In other respects similar to the preceding ..... 7. Narrow-leaved Orache.*

THE SPINACH FAMILY.

* This is probably only a narrow-leaved form of the Common Orache.

HABITATS AND LOCALITIES.

1. Perennial Goose-foot—(*Chenopódium Bonus-Henricus.*)

Banks and waste places, but not very common. Plentiful near Ashton-upon-Mersey Church, and in a farm-yard below Mellor Church. Clayton Vale, Chorlton, Withington. Fl. August.

Curtis, i. 162; E. B. xv. 1033.

2. White Goose-foot—(*Chenopódium álbum.*)

Abundant on waste and cultivated land, and especially on the borders of potatoe and turnip fields. Fl. August. Annual.

Curtis, i. 87; E. B. xxiv. 1723.

A variety with greener and less serrate leaves, called *C. viride* by Linnæus and Curtis (i. 88), is also pretty common.

3. Red Goose-foot—(*Chenopódium rúbrum.*)

Botany Bay Wood, below Worsley (J. E.), and frequent in waste places about Bowdon. Fl. August, September. Annual.

Curtis, ii. 385; E. B. xxiv. 1721.

The seeds are not larger than sea-sand.

4. Sharp-leaved Goose-foot—(*Chenopódium polyspérmum*, variety β, *acutifolium.*)

"Common as a weed in gardens at Cheetham Hill." (B. G.) Fl. August, September. Annual.

Curtis, i. 118; E. B. xxxi. 1481 (as *C. acutifólium*).

5. Fœtid Goose-foot—(*Chenopódium ólidum.*)

As a weed in gardens at Back Levenshulme (1858), and occasionally in cultivated fields. Fl. August. Annual.

Curtis, ii. 312; E. B. xv. 1034.

6. Common Orache—(*Atriplex pátula.*)

Waste and cultivated ground, a common and disagreeable weed. Fl. July. Annual.

Curtis, i. 139 (as *A. hastata*); E. B. xiii. 936; Baxter, v. 356.

7. Narrow-leaved Orache—(*Atriplex angustifólia.*)

In similar situations, common. Fl. July. Annual.

E. B. xxv. 1774.

In the "Flora Mancuniensis," p. 23 (1840), *Chenopódium ficifólium* is said to grow "in cultivated fields about Chorlton, but not common."

XXXIX.—AMARANTH FAMILY. *Amarantáceæ.*

Herbaceous plants, with simple, undivided, entire leaves, and minute flowers, consisting of calyx only, but often so brightly-coloured, and produced in such plenty, as to render the mass of the inflorescence shewy, and even superb. They belong chiefly to the tropics, and in the colder regions of the world exist only in cultivation.

One species, the Blite, or *Amaránthus Blítum*, is semi-naturalized in England, and among other places, found near Manchester; an insignificant weed, with procumbent stems, ovate and obtuse leaves, and small lateral clusters of trimerous green flowers.

HABITATS AND LOCALITIES.

As a weed in the garden at High Bank, Prestwich. (J. P.) Fl. August, September. Annual.

E. B. xxxi. 2212; Baxter, vi. 482.

Green-houses are enriched by the splendid Cock's-comb, or *Celósia cristáta*, and the Globe-Amaranth, or *Gomphréna globósa*, with flowers resembling violet-coloured strawberries, borne on the summits of tall, bare peduncles; and gardens, by the Love-lies-bleeding, or *Amaránthus caudátus*, its long green or blood-red tails lasting till the end of autumn. Occasionally there are seen also the Prince's-feather, or *A. hypochondríacus*, resembling the former, but upright, and with deep-red foliage; and the *A. tricolor*, esteemed for its variegated leaves.

XL.—THE BIRD'S-NEST FAMILY. *Monotropáceæ.*

A little family of herbaceous *parasites*, that is to say, plants that fix themselves, either when they vegetate from the seed, or very soon afterwards, upon the stems, branches, or roots of other plants of a different kind, feeding upon their juices, instead of procuring nourishment direct from the earth and atmosphere. There are several

different families of them, mostly agreeing, as to their flowers and fruit, with families of high development, but generally destitute of leaves, or at all events of *green* leaves, though usually provided with scales that represent those organs. The mistletoe is an example of a parasite where the ordinary green colour of flowering vegetables is preserved. The leafless parasites are usually of a dingy cadaverous white or brownish colour, passing into purple or yellowish, their stems rising to the height of six or eight inches, and fixed upon the roots of trees and shrubs. Such is the case with the present family, one species of which grows wild in England, but not within the limits of the Manchester Flora. It is found, however, at Southport, on which account the family is here included. (See Appendix of Southport and Blackpool plants.) The affinities of the *Monotropaceæ* are nearest with the *Pyrola* Family.

XLI.—THE TAMARISK FAMILY. *Tamaricáceæ.*

A little family of shrubs and herbs, usually growing by the sea-side, though sometimes by the edges of rivers and torrents, and having its maximum, both of species and individuals, on the borders of the Mediterranean. One species reaches to England, growing on the southern coasts, though doubtful if truly wild, and on account of its beauty, has been brought into the garden. The Tamarisk or *Tamarix Gallica* (E. B. xix. 1318.) is a slender shrub, three to five or six feet high, with numerous twiggy and flexible branches, erect, or slightly pendulous at the extremities, and covered with minute, green, scaly, and pointed leaves, pressed close to the stem, the general *ensemble* of the plant being elegantly light and feathery. The flowers are small, pink or white, pentamerous, crowded into numerous spikes an inch or two long, and followed by little capsules of abundant feathery seeds. The Tamarisk is not a common plant, but may be seen in good shrubberies.

XLII.—THE CAPER FAMILY. *Capparideæ.*

A family of herbaceous plants, shrubs, and trees, chiefly found in the tropics, and in the countries bordering on them, and in structure strongly resembling the *Brassicaceæ*, from which they are distinguished

by their numerous stamens and kidney-shaped seeds. Any affinity their tetramerous flowers might be supposed to indicate with the poppies, is disproved by their calyx not falling when the petals expand, and by their seeds being destitute of albumen. A few only are cultivated, and those chiefly in hot-houses and conservatories, the principal being the common caper-bush or *Capparis spinosa*, which yields the capers used for pickles, some others of the same genus, and one or two *Cleomes* and *Cratævas*. The dark-green, bushy, and milky-juiced plant commonly called caper-tree in gardens, has no affinity with the genuine caper, being a species of *Euphorbia* or spurge, as will be noticed in due course; neither has it a relative in the *Tropæolum* or *Nasturtium* (page 107), the seeds of which, being used for the same purpose, are also popularly called capers.

XLIII.—THE MARVEL OF PERU FAMILY. *Nyctagináceæ.*

A little family of obscure and weedy herbaceous plants, with a few shrubs and trees, natives of all the warmer parts of the world, though not extending much beyond them. They are closely allied to the Spinach and Amaranth Families (pages 160—163), but differ from both in the curious conditions of the calyx and fruit. The calyx, after blooming, hardens into a bony shell, which serves as a cover to the latter, the actual envelope of the seed being nothing more than a thin membrane. The seeds are remarkably albuminous, appearing as if composed of white flour, and the stems are frequently jointed, like those of geraniums. All that is known of these plants about Manchester is furnished in two ornamental garden flowers from Mexico, the *Mirabilis dichotoma* and the *Mirabilis longiflora*, the seeds of both of which are sold in the shops under the name of Marvel of Peru. Few, however, care to cultivate them. The blossoms of the *dichotoma* are of many different colours upon the same stem. They seldom expand earlier than four o'clock in the afternoon, from which circumstance the plant has been named Four-o'clock-flower; and being of great beauty under the light of lamps, is by the French called *Belle de Nuit*. When cultivated in large pots, few plants are better adapted for the decoration of saloons during evening assemblies.

GROUP II.—OVARY FREE AND ENCLOSED; STAMENS ON THE PERIANTH.

XLIV.—THE ICE-PLANT FAMILY. *Ficoideæ* or *Mesembryáceæ.*

Small herbaceous plants, frequently procumbent, and remarkable for their extreme succulence and the singular forms of their leaves, which, being distended with fluid, often assume solid geometrical figures, and resemble lumps of green pulp. The petals are long, numerous, very slender, and generally of some vivid colour, as crimson or yellow, giving the flowers much the aspect of those of Composites, with which, however, being simple, they have no actual affinity. Their relationship is completest with the Cactus Family, but from these the perigynous stamens keep them distinct; and with no other, unless the *Crassulaceæ*, where succulent leaves also prevail to a great extent, is it possible to confound them. The latter are distinguished by the stamens being placed upon the receptacle, and the petals rarely exceeding five. The *Ficoideæ* are further remarkable for the extreme sensitiveness of their blossoms to atmospheric changes.

The hot sandy plains of the Cape of Good Hope furnish the chief part of this eccentric family, a few being found also in the precincts of the Mediterranean and elsewhere. They are known in England only as inmates of the green-house, except the half-hardy ice-plant, or *Mesembryánthemum crystallinum*, so beautiful in the glittering watery beads with which its entire surface is besprinkled. A large number of the species are figured in an expensive work at the Free Library,—Decandolle and Redouté's "*Plantarum Succulentarum Historia*," 2 vols. folio.

XLV.—THE SCLERANTHUS FAMILY. *Scleranthàceæ.*

A family of about a dozen insignificant little weeds, with minute, pentamerous green flowers, consisting only of calyx, and narrow, opposite leaves connected at the base. Two species grow wild in England, one of them being found near Manchester,—the *Scleránthus ánnuus*, a much-branched glabrous little plant, two to three inches high, immediately known by the family characters above given, and from any possible forms of pearlwort or spurrey, by its one-seeded ovary, that of the latter plants being many-seeded.

HABITATS AND LOCALITIES.

Sandy ground, both waste and cultivated, frequent. Common about Bowdon and Baguley. Fl. July. Annual.

E. B. v. 351; Baxter, vi. 439.

XLVI.—THE MEZEREON FAMILY. *Thymeláceæ.*

Shrubs of inconsiderable stature, with flowers recommended either by their tender loveliness, early appearance, or delicious odour. Leaves simple, undivided, entire, exstipulate, and often evergreen; inflorescence various; perianth single, tubular, and four-cleft, pink, white, or greenish, and often downy or hairy on the outside; stamens eight, four long and four short, inserted in the mouth of the tube; pistil solitary; stigma capitate, and almost sessile; ovary one-celled, often becoming a berry.

About three hundred species are known, natives principally of Australia and the Cape of Good Hope, though many belong to the colder parts of India and South America. In Europe they occur but sparingly. They are remarkable for the stringiness and tenacity of their bark, and no less for the caustic properties of the same part, which supplies, in different kinds, materials for paper and fine cordage, and for use in medicine as an irritant and vesicatory. The celebrated lace-bark tree, or *Lagétta linteária*, of the West Indies, is foremost in the first respect, and the common red mezereon in the second. Every part of this well-known shrub is excessively acrid, and acts as a local irritant poison. Birds alone eat the berries with impunity.

Fig. 116.
Flower of Mezereon (cut open).

Two species grow wild in England, one of them being found near Manchester,—the spurge laurel, or *Dáphne Lauréola*, a glabrous shrub, two to three feet high, its erect, flexible, and nearly naked branches terminating in rosettes of lanceolate and evergreen leaves, two or three inches long, and bearing in their axils small clusters of greenish-

yellow and scentless flowers, each of which is accompanied by an oval and concave bract. Berries ovate and blueish-black.

HABITATS AND LOCALITIES.

Formerly abundant on a woody bank near the Bollin, below Cotterill, but now almost extirpated by the herb-doctors, who have already destroyed it once, the present plants being only seedlings. Found also, but very sparingly, near Leigh. (Mr. Joseph Caldwell.) Common in gardens and plantations. Fl. March, April.

Curtis, iv. 607; E. B. ii. 119.

The true mezereon, or *Dáphne mezéreum*, (E. B. xx. 1381.) the cheerful, red or white, and sweetly fragrant blossoms of which come out so thick upon the long, bare branches in the very earliest dawn of spring, is the second of the two English species, being found wild in the southern counties, though here only an inmate of the garden. Its perfume is surpassed, though it seems impossible, by that of the exotic *Dáphne Cneórum*, and several green-house species. Under glass, the family is represented chiefly by the exquisite *Gnidias* and *Piméleas* of New Holland, along with species of *Dáis* and *Struthíola*.

XLVII.—THE PROTEA FAMILY. *Proteáceæ*.

Shrubs, and in their native countries often large trees, ornamenting New Holland and the Cape of Good Hope with some of their finest and most remarkable vegetation. Several hundred species have been named, a large proportion of them being cultivated in conservatories, where the neatness of their appearance, and the oddity of their flowers and inflorescence, cause them to be much prized. They are remarkable for their hard, dry, leathery, and evergreen leaves, often serrated in a very curious and peculiar manner; the foliage, taken along with the irregular and tetramerous flowers, which consist of a tubular calyx only, with four stamens and a single pistil, sufficing in every instance to stamp the family. A happier name than *Protea* could not have been bestowed upon them, for in no family is there such diversity as severs the *Bánksias*, the *Dryándras*, the *Grevílleas*, the *Leucadéndrons*, and the forty other genera that compose it. *Leucadéndron argénteum* is called the silver-tree, on account of the brilliant whiteness of its silky foliage.

XLVIII.—THE BAY-TREE FAMILY. *Laurácea.*

A noble family of exotic and mostly tropical trees and shrubs, generally fragrant and aromatic, if not in their living substance, in their products, which include cinnamon, cassia, benzoin, camphor, and sassafras. A cinnamon-tree under the cupola of the conservatory at the Botanic Gardens may be found by means of its large, smooth, oval, three-ribbed, entire, and pointed leaves, and panicles of small white flowers, not very unlike the white-blossomed Persian lilac. The only member of the family which can live in the open air in this part of the country, is the bay, or *Laŭrus nóbilis*, the leaves of which, smelling like cinnamon, are so much esteemed for the agreeable flavour they give to custards and confectionery. It is instantly distinguished from all other trees by the rich odour of the leaves when bruised, and by the green and insignificant blossoms, which are unisexual, and appear in May. A fine young plant of it grows against the front of the house, No. 38, on Bowdon Downs. The common laurel has nothing to do with the genus *Laurus*, being a species of the Rosáceæ.

XLIX.—THE PEA FAMILY. *Leguminosæ* or *Fabaceæ.*

The assemblage represented by the pea is the very perfection and *beau-idéal* of a botanical family. Every diversity of size, stature, and configuration occurs in it, from the tender procumbent annual that dies, like Semele, in the embraces of the summer sun, up to trees of such enormous dimensions, that in reading of them we think of "travellers' tales," and the age attained by which already exceeds three thousand years.* Every modification of inflorescence, and of the beautiful and expansive idea of the compound leaf, has examples in it; every variety also of habit and general aspect; and yet there is no family more easily recognized, or in which the original design is more consistently preserved. Under all its myriad changes, it is still plainly and conspicuously the Pea Family. Neither is any family more widely diffused. While it glorifies the tropics, it is the festive wreath of cold and temperate climates (the island of St. Helena alone

* See, for particulars respecting the vegetable patriarchs alluded to, "Life, its Nature, Varieties, and Phenomena," chap. viii. Ed. 2.

excepted); and though numbers of its species are proximately unserviceable, there are few that can be designated insignificant or weedy. In every family there is a proportion of uninteresting plants. In the middle of a rich kingdom we always expect a certain amount of desert land, and the *Leguminosæ* only follow the usual rule. The

Fig. 117.
Butterfly-shaped flower.

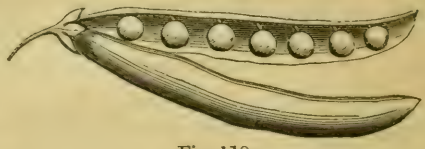


Fig. 118.
Legume of Pea.

variety of their use to man is as great as the multiformity of their features. Timber; dyes, such as logwood; medicines, such as senna leaves; sweet and nourishing vegetables of the kind called pulse, as peas, beans, and the flat-sided lentils; gums, including gum-arabic and gum-tragacanth; wholesome juices, such as liquorice; perfumes,

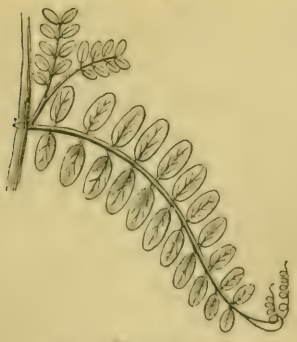


Fig. 119.
Pinnate leaf with tendril.

Fig. 120.
Diadelphous stamens.

such as the Tonquin-bean, are all yielded abundantly by this noble family, which stands among plants like the city of Queen Dido in the days of Æneas,—"Carthago, dives opum." Deleterious species frequently occur in the tropics, but there are none such in England,

or at least among the wild ones. The only garden species of ill-fame, in this respect, that is at all common, is the Laburnum, the seeds of which are poisonous.

Fig. 121.

Fig. 122.

Fig. 123.

The estimated number of *Fabaceæ* is now not far short of seven thousand, the whole of them being known by the presence of one or other of two characters, namely, a butterfly-shaped flower, as in Fig. 117, or a leguminous or pea-like fruit, as in Fig. 118. By far the

Fig. 124.

largest portion have these two characters combined. It is only in some tropical and extra-European species that we find a deviation from either of them, and those in which the fruit is the abnormal part

are so exceedingly rare that in practical English Botany they are of no account. The presence of a legume, or pod formed on the type of the common green-pea (though sometimes only one-seeded, or twisted, or jointed), is sufficient for the determination of any species ever likely to be seen alive. Those most unpea-like flowers of all, the Australian Acacias and the Cassias, acknowledge themselves leguminous when the time comes to ripen their fruit. The papilionaceous or butterfly-shaped flower is *peculiar* to the family, and is mimicked only by the *Polygala* (p. 156).

Fig. 125.

Reduced to a technical form, the description of the family will be as follows:—Stem herbaceous, shrubby, or arborescent; sometimes twining. Leaves alternate, stipuled, and compound in every variety, as in Figs. 121, 122, 123, 124, and 125, with very many others; sometimes reduced to a single leaflet, or even to a thorn, and when the stem is slender, often terminating in tendrils. (Fig. 119.) Flowers, in the great mass of the family, irregular, pentamerous, and butterfly-shaped, with ten stamens, that often adhere by their filaments; in the remainder rosaceous, with numerous independent stamens, and sometimes unisexual. Ovary in all cases single, with a single style and

stigma. Fruit almost universally a legume, subject to modifications of shape and contents, but in a few cases drupaceous. The legumes of the tropical species are most curiously diversified, and not a few even in our own country disguise themselves; while the seeds are among the most beautiful in nature, being often of resplendent colours, or prettily mottled, as in the common French and scarlet beans. The leaves are extremely prone to close in the evening, a circumstance helping to distinguish this family as one preëminently of compound leaves, since divided leaves, however closely they resemble compound ones, never in the slightest degree change their position. The cohesion of the filaments, where these parts grow together, is of two kinds. Either the whole ten combine, edge to edge, and form a tube, which encloses the ovary, though sometimes split along the upper side; or nine unite, and the tenth stands apart, as in Fig. 120. This latter mode of growth is termed "diadelphous," and pervades the principal part of the species of temperate latitudes. The broom, the furze, and the rest-harrow may be cited as examples of the "monadelphous" or wholly combined condition. None of the native kinds have the stamens free.

Seventy-seven species grow wild in Britain, thirty-eight of them occurring near Manchester, and distinguished by the characters given in the analytical table below. The two species of furze, the two *Genistas*, and the broom, are shrubby, the remainder herbaceous, and often tender-stemmed. Half the number are common almost everywhere, and not more than half-a-dozen are unattractive. The flowers of the two commonest, or the furze and the honey-clover, are unsurpassed in powerful odour by those of any of our native plants. The melilot is equally fragrant, smelling, as the sweet woodruff does, like new-mown hay, after it has been gathered and become dry.

PRELIMINARY ANALYSIS.

A. Plant more or less thorny, p. 174.
B. Plant destitute of thorns.
I. Leaves all, or nearly all, simple.
II. Leaves all compound.
* Leaves with tendrils at the end.
** Leaves without tendrils, p. 175.
† Leaves pinnate.
†† Leaves trifoliolate.
‡ Flowers a decided yellow.
‡‡ Flowers not yellow, p. 176.

PARTICULAR ANALYSIS.

A.—*Plant more or less thorny.*

Flowers pink.

Stem prostrate, shrubby, thorny towards the close of summer; lower leaves trifoliolate, upper ones simple ..... 1. Trailing Rest-harrow.

Flowers yellow.

Leaves ovate or lanceolate; upper branches thornless; thorns very fine and sharp; pod larger than the calyx ..... 6. Needle-whin.

No flat leaves whatever, the whole being developed in the condition of thorns; pod scarcely longer than the calyx.

Calyx very hairy; plant two to five feet high.... 2. Common Furze.

Calyx nearly glabrous; plant low-growing, and nearly procumbent ..... 3. Dwarf Autumnal Furze.

B.—*Plant destitute of thorns.*

I.—*Leaves all, or nearly all, simple; lower ones sometimes trifoliolate.*

All the leaves simple and lanceolate; flowers in terminal, rather close, clusters..... 5. Dyers' Greenweed.

Lower leaves trifoliolate; flowers axillary and solitary.

Flowers pink; stems prostrate ..... 1. Trailing Rest-harrow.

Flowers yellow, brilliant; stems upright; branches long, straight, green, smooth, and pliant .. 4. Common Broom.

II.—*Leaves all compound.*

* *Leaves with tendrils at the extremity.*

Leaflets only two.

Flowers in bunches; pods black..... 7. Yellow Vetchling.

Leaflets numerous.

Flowers axillary and sessile, or nearly so.

Flowers mostly in fours, dull purple; leaflets gradually smaller upwards; pods black.... 8. Hedge Vetch.

Flowers only one or two together.

Flowers mostly in pairs.

Leaflets oblong; flowers particoloured..... 11. Fodder Vetch.

Leaflets linear; flowers crimson..... 12. Narrow-leaved Crimson Vetch.

Flowers solitary, crimson..... 13. Bobart's Vetch.

Flowers in long-stalked clusters.

Flowers numerous, beautiful, and conspicuous.

Flowers deep violet, in long, slender, unilateral clusters ..... 9. Purple-tufted Vetch.

Flowers white, exquisitely pencilled with lilac.. 10. Pencilled Wood Vetch.

Flowers few, very minute, pale bluish.

Stalks many-flowered; leaflets obtuse; pods hairy and two-seeded ..... 14. Common Tare.

Stalks two-flowered; leaflets pointed; pods smooth and four-seeded ..... 15. Smooth-podded Tare.

** *Leaves without tendrils.*

† *Leaves pinnate.*

1. Leaves of two or four leaflets, without an odd one. 16. CRIMSON HEATH-VETCH.
2. Leaves of five leaflets, the lowermost pair close upon the stem.
   Stem solid, nearly prostrate; flowers in umbels of three to five.
      Leaflets egg-shaped ..... 17. MEADOW LOTUS.
      Leaflets linear-lanceolate..... 18. SLENDER LOTUS.
   Stem hollow, erect; flowers in umbels of six to twelve ..... 19. GREAT CORONET LOTUS.
3. Leaves of numerous pairs of leaflets, an odd one at the end.
   Stems upright; flowers large, crimson, in pyramidal heads ..... 21. SAINT-FOIN.
   Stems prostrate; flowers minute, prettily variegated, in little umbels ..... 20. BIRD'S-FOOT.

†† *Leaves trifoliolate.*

‡ *Flowers a decided yellow.*

Flowers in long, upright racemes, all pointing one way.
   Pod irregularly net-veined and wrinkled; stem usually two or three feet high..... 22. COMMON MELILOT.
   Pod transversely wrinkled; stem usually under two feet high..... 23. FIELD MELILOT.
Flowers in round or oval heads, or little umbels.
   Pod scarcely protruding beyond the calyx, and straight, or at least neither prickly nor twisted.
      Head of flowers large, dense, and shewy; upper petal furrowed ..... 31. YELLOW HOP TREFOIL.
      Head of flowers scanty and small; upper petal not furrowed.
         Middle leaflet stalked; heads many-flowered.. 32. LITTLE YELLOW TREFOIL.
         Middle leaflet sessile; heads few-flowered .. 33. LEAST YELLOW TREFOIL.
   Pod projecting beyond the calyx, usually edged with prickles, and spirally twisted.
      Pod spiral, prickly, and several-seeded.
         Spire of three to four convolutions, and furrowed at the edge.
            Plant glabrous; leaves spotted with black.. 36. SPOTTED MEDICK.
            Plant downy; leaves not spotted ..... 38. LITTLE BUR MEDICK.
         Spire of two to three convolutions, and not furrowed at the edge..... 37. TOOTHED MEDICK.
      Pod not forming a complete spire, rugged, black, and one-seeded ..... 35. COMMON FIELD MEDICK.

‡‡ *Flowers red, purple, white, or cream-coloured, never yellow.*

Heads of flowers abounding with long soft hairs.
- Corolla small, concealed ..... 28. Hare's-foot Trefoil.
- Corolla large, conspicuous ..... 29. Carnation Clover.

Heads of flowers without long hairs.
1. Flowers red or crimson.
   - Teeth of calyx equal in length ..... 30. Little Knotted Trefoil.
   - Lower tooth of calyx longer than the rest.
     - Stems upright; heads ovate: stipules ovate, abrupt ..... 26. Common Honey Clover.
     - Stems remarkably zigzag; heads globular: stipules lanceolate, tapering ..... 27. Zigzag Clover.
2. Flowers violet or blue; plant erect, glabrous .. 34. Lucerne.
3. Flowers white or cream-coloured.
   - Calyx smooth; stems prostrate, creeping.... 24. Common White Clover.
   - Calyx hairy, at least on the teeth: stems a foot high, erect, or nearly so, and downy 25. Cream-coloured Clover.

The medicks (including Lucern) are distinguished among British plants by their little legumes coiling up spirally, as they ripen, into a ball resembling a snail-shell, the outer edge often fringed with minute teeth. In *Medicago lupulina* the spire is incomplete.

The legumes of the furze, the clovers, the trefoils, the melilots, the saint-foin, and the rest-harrow, are straight, very short, and seldom contain more than one seed. Those of the melilots are wrinkled.

Those of the lotus, in its different species, are long, slender, cylindrical, and smooth.

Those of the bird's-foot are formed of several single-seeded joints, which readily break apart when ripe.

Those of any other Leguminosæ wild near Manchester resemble small peas or beans.

HABITATS AND LOCALITIES.

1. Trailing Rest-harrow—(*Onónis arvénsis.*)

Barren pastures, and dry, ill-cultivated fields; also on slopes of sunward hills where the soil has little moisture in it, and the turf is short, and pleasant to sit upon. Near Hope Square, Prestwich. (J. P.) Pastures opposite Bramhall, to the left. Bredbury, Strines, Marple, Capesthorne, and other places thereabouts, but rather rare. Plentiful

in a field upon Mr. John Earl's farm at Warford, between Chelford and Mobberley. (Mr. Holland.) Fl. June—August.

E. B., Supp. i. 2659.

E. B. x. 682, is the *Onónis antiquórum*, distinguished by its erect stems, spinous at all times, the *arvensis* being spinous only at the close of summer. The former state of the plant, for it can hardly be deemed a different species, does not appear to occur with us. When fully expanded, the flowers are most beautiful, being large, and of a fine lively pink. The plant is called rest-harrow from the hindrance offered to the farmer by its long tough roots.

2. Common Furze—(*Ulex Europæus.*)

Heathy and waste ground, which is often made refulgent by its golden blossoms; also by waysides, and occasionally in hedges, common everywhere, and flowering more or less all through the year, but most abundantly and brilliantly in the early part of summer.

E. B. ix. 742; Baxter, ii. 93.

Opening its cheerful blossoms while the white snow-bones still lie unmelted on the chilly hedgebanks, and with the hoar-frost often glazing its yellow clusters, the furze is a gladsome sight when there is scarcely another wild-flower to be seen. I have known it golden all over as early as February 18th. No plant is more broadly characteristic of English scenery and of the English climate. Warmth is incongenial to its rude and hardy nature; yet though to appearance so robust, in Russia, Sweden, and Norway, it needs the shelter of the green-house. Linnæus, when he came to this country, fell on his knees with admiration of the magnificent spectacle it presented to him, having never before seen it in such splendour and profusion.

A double-flowered variety is common in gardens, interesting as one of the very few species of this vast family in which the double condition occurs. While the *Ranunculaceæ*, the *Papaveraceæ*, and some other families, seem dissatisfied, almost universally, with the single state, here, in the *Leguminosæ*, it is so rare for the flowers to multiply their petals, that I can only call to mind, in addition to the furze, the *Lótus corniculátus* and the *Genista tinctória*. Seedling plants of furze, which may be found in plenty about midsummer, have trifoliolate leaves that plainly shew the nature of the thorns which afterwards usurp the place of normal foliage. When ripe, the seed-pods are nearly black; upon hot days they burst with a sharp crackling noise, and shoot out the seeds. The flowers smell like rue.

3. Dwarf Autumnal Furze—(*Ulex nánus.*)

Dry heaths and moors, and in rough, hilly pastures. Kersal Moor; Highfield Moss, near Parkside; abundant on Lindow Common. Fl. only in the autumn.

E. B. xi. 743.

Much of the picturesque effect of furze towards September is owing to this species, rather than to the taller and larger *Ulex Europæus*, which is generally in fruit, to a great extent, when the *nanus* is but in the day-spring of its glory.

4. Common Broom—(*Spártium Scopárium.*)

Dry thickets and hedges, also on hills, the largest and most shewy of our native yellow-flowered Leguminosæ. Plentiful about Sale, Ringway, Eccles, Withington, and between Handforth and Styall. Often left as a cover for game. Fl. May, June.

Curtis, ii. 344; E. B. xix. 1339; Baxter, i. 77.

Common everywhere in gardens, where the blossoms vary to straw-colour. The full-blown corolla appears as if it were falling to pieces, so loosely are the petals held together. The legumes, which are produced copiously, are, when ripe, nearly black, and fringed along the edge with whitish hairs.

5. Dyers' Green-weed—(*Genista tinctória.*)

Thickets, pastures, and borders of fields, especially on clay. Withenshaw, Hyde, Styall, Baguley, Mobberley, Rostherne, and very abundant above Strines. Fl. July, August.

E. B. i. 44; Baxter, ii. 84.

6. Needle-whin—(*Genista Anglica.*)

Heaths and moors, rare. Baguley; Seal-bark, Greenfield; Stalybridge Brushes; Highfield Moss, near Parkside (J. E.); Ashworth, near Heywood, along with the *Orchis conopsea.* (J. P.) Fl. June.

E. B. ii. 132.

7. Yellow Vetchling—(*Lathyrus praténsis.*)

Borders of fields, hedges, thickets, and bushy places, abundant everywhere. Frequent also in meadows, among the mowing-grass. Fl. June, July.

Curtis, i. 189; E. B x. 670.

An untidy, but sprightly and pleasing flower, its corollas all looking one way.

8. Hedge Vetch—(*Vicia sépium.*)

Everywhere on hedgebanks, and by waysides, where sheltered. Fl. May, June.

E. B. xxii. 1515.

Readily distinguished by its axillary clusters of four to six nearly sessile flowers, of a dull blueish-purple colour, and by the leaflets gradually decreasing in size towards the upper extremity of the leaf. It is the only native species of the *Leguminosæ* which consorts with dead-nettles, wild mustard, and other plebeians.

9. Purple-tufted Vetch—(*Vicia Cracca.*)

Hedges, thickets, and among mowing-grass, abundant. Fl. July, August.

Curtis, ii. 346; E. B. vii. 1168.

Every botanist has his favourite flower, and I think mine is the purple-tufted vetch. Its deep violet and blue racemes, delicately pinnate and tendrilled leaves, and slim and fragile stems, that seem to float in the air rather than to have risen from the earth, form an *ensemble* that I never look upon without renewal of the fulness of delight which they first inspired a quarter of a century ago, when with the *Polypodium vulgare*, the *Cotyledon umbilicus*, the feathered *Clematis*, and other common but magic things, this lovely plant entered the sanctuaries of my imagination. The legumes, which are of a delicate light-brown, are produced in abundance, and ripen at the time of the blooming of the wildhop.

10. Pencilled Wood Vetch—(*Vicia sylvática.*)

Abundant in Cotterill Clough and the vicinity; found also in damp hedges about Worsley, Tyldesley, Atherton, and Little Hulton (G. H.); and at Bramhall. (Mr. Isaac Williamson.) Fl. July, August.

E. B. ii. 79; Baxter, iii. 173.

A charming ornament for a garden hedge.

11. Fodder Vetch—(*Vicia sativa.*)

Common in cultivated fields, and sown as "fitches" abundantly for the food of horses, between the first and second cuttings of red clover. Wild about Lymm, and at Bowdon, on the banks of the Chester Road. Fl. May, June. Annual.

E. B. v. 334.

12. Narrow-leaved Crimson Vetch*—(*Vicia angustifolia.*)

Hedgebanks, green hillocks, and dry, heathy places, rather uncommon. Chiefly in the neighbourhood of Bowdon and Dunham. Withington; Burnage; Rostherne. Fl. June. Annual.

E. B., Supp. i. 2614.

13. Bobart's Vetch*—(*Vicia Bobártii.*)

Plentiful in Haughton Dale, on the banks of the Tame. Fl. June. Annual.

E. B., Supp. i. 2708.

* That these two are really distinct is, I think, without any sort of proof, and it may be questioned whether both would not better be included in the fodder vetch.

14. Common Tare—(*Ervum hirsûtum.*)

Cornfields and on moors, very common, and equally unattractive. Borders of Carrington Moss, every year. Fl. June, July. Annual.

Curtis, i. 54; E. B. xiv. 970; Baxter, v. 322.

15. Smooth-podded Tare—(*Ervum tetraspérmum.*)

In similar situations, but less frequent. Chiefly about Chorlton, Withington, and Northen. Fl. June, July. Annual.

Curtis, i. 55: E. B. xvii. 1223.

16. Crimson Heath Vetch—(*Orobus tuberósus.*)

Thickets and edges of woods, accompanying the primrose and the blue-bell, in that sweet season when the woods, though green, are shadeless.

Curtis, i. 53; E. B. xvii. 1153; Baxter, vi. 433.

The petals are of a lively crimson when they expand, but as they wither, turn blue. The young legumes are remarkable for their red colour.

17. Meadow Lotus—(*Lótus corniculátus.*)

Meadows and pastures, common, delighting in grassless edges of rough banks, where nothing shall intercept the sun.

Nowhere does this refulgent little plant seem to enjoy itself more thoroughly than on the sunward slopes of railway cuttings, where it often forms patches a yard across, looking like waves of molten gold. Fl. July, August.

Curtis, i. 129; E. B. xxx. 2090; Baxter, iv. 249.

The flowers vary sometimes to a tawny orange colour, and are usually pink upon the outside before expansion. At Lymm the plant is called Ground honeysuckle.

18. Slender Lotus*—(*Lótus ténuis.*)

Dry pastures and waste places, chiefly in the district lying to the left of the Bowdon Railway. Fl. July.

E. B., Supp. i. 2615.

19. Great Coronet Lotus—(*Lótus májor.*)

Moist, shady banks of ditches, supported by taller and stronger

* This can scarcely be deemed anything more than a slender, narrow-leaved variety of the common meadow lotus.

plants, a frequent companion of the meadow-sweet. Abundant and fine in the neighbourhood of Carrington Moss. Fl. July, August

E. B. xxx. 2091.

A remarkably handsome flower.

20. Bird's-foot—(*Ornithopus perpusillus.*)

Sandy and gravelly places, and by waysides, not infrequent. Kersal Moor; Monton Green (J. S.); hedgebanks near Offerton Hall, between Stockport and Marple; top of Werneth Lowe; common about Mobberley, Baguley, and Bowdon; and abundant on the lawn at Tatton. Fl. June. Annual.

Curtis, ii. 417; E. B. vi. 369; Baxter, v. 358.

One of the most delicate of our native plants. The stems trail to the length of six or eight inches; the tiny cream-coloured flowers are exquisitely veined with crimson, and when gone, are replaced by clusters of three to five or six jointed and curved legumes, resembling the claws of a little bird.

21. Saint-foin—(*Onobrychis sativa.*)

Occasionally seen in cultivated fields, the seeds being brought with those of the crop, or deposited from former plants similarly introduced. Fl. June, July.

E. B. ii. 96 (as *Hedysarum Onobrychis*); Baxter, ii. 134.

A plant of remarkable beauty, known immediately by its pinnate leaves and large cones of crimson flowers, supported on long axillary peduncles, and resembling those of the *Orchis pyramidalis.*

22. Common Melilot—(*Melilotus officinalis.*)

Cornfields, but very unusual, coming unexpectedly, and perhaps not found again in the same place. Withington; Bowdon; Bramhall (Mr. Isaac Williamson); Pilkington (J. P.); Eccles; and Monton. (J. S.) Fl. June, July. Annual.

E. B. xix. 1340 (as *Trifolium officinale*); Baxter, v. 363.

The racemes resemble those of the purple-tufted vetch.

23. Field Melilot—(*Melilotus arvensis.*)

Cornfields about Unsworth. (J. P.) Fl, July, August. Annual.

E. B., Supp. i. 2690.

24. Common White Clover—(*Trifolium repens.*)

Everywhere in meadows and pastures, and by waysides, flowering throughout the summer.

Curtis, i. 191; E. B. xxv. 1769.

The blossoming of the white clover commences with the lower flowers, which, as fast as overblown, turn brown, and bend downwards, presenting a singular contrast to the white and erect corollas on the upper and younger portion of the head. The leaves are sensitive to the light, and when the plant is in vigour, generally close at the approach of evening. The leaflets are often prettily marked with white arches, and a variety not uncommon in gardens, has them of a deep maroon colour. In the latter the leaves are often quinate, and even septate. The sepals are frequently so much enlarged as to give the head a green and tufted look, like that of a viviparous grass; and occasionally the corollas assume a pinky tint.

25. Cream-coloured Clover—(*Trifolium ochroleúcum.*)

Occasionally in dry, cultivated fields. Chorlton, Hyde, and near Strines. (Mr. J. Sidebotham.) Fl. July, August.

Curtis, ii. 413; E. B. xvii. 1224.

The corolla turns brown when overblown, like that of the *T. répens.*

26. Common Honey Clover—(*Trifolium praténse.*)

Meadows and pastures, everywhere, both cultivated and as the result of former cultivations. Fl. summer and autumn.

E. B. xxv. 1770; Baxter, iv. 283.

The leaflets often have white arches on them, like those of the *T. répens.*

27. Zigzag Clover—(*Trifolium médium.*)

Dry banks and uncultivated edges of fields, generally entangled among low and scrubby bushes, common. Fl. summer and autumn.

E. B. ii. 190.

The flowers are much more elegant than those of the common honey-clover, from which it is distinguishable not more by its globular instead of egg-shaped head of flowers, its wavy and zigzag stem, and spotless leaves, than by its habitats, which are never in the open fields, but always in some scene of entanglement, and often of prickles.

28. Hare's-foot Trefoil—(*Trifolium arvénse.*)

In dry, cultivated fields, but very infrequently. Withington; Bowdon, with the *Reseda lutea;* at Eccles, among Italian rye-grass (J. S.); Mobberley. (Mr. Holland.) Fl. July, August. Annual.

Curtis, ii. 414; E. B. xiv. 944.

Italian rye-grass is the crop in which this curious little plant is to be looked

• Th. greatest likelihood of success (avoiding trespass into the field as much as variety ò, since the two plants are in perfection at the same time.

29. Carnation Clover—(*Trifolium incarnátum.*)

Near the Grange, Ashton-upon-Mersey, plentiful, 1858. (Mr. J. Sidebotham.) Also at Bowdon. Fl. July. Annual.

E. B., Supp. iii. 2950.

Unquestionably introduced as a farm plant, and afterwards self-sown.

30. Little Knotted Trefoil—(*Trifolium striátum.*)

On the banks of the Mersey, at Woolstone, near Warrington, plentiful. (J. P.) Fl. June. Annual.

E. B. xxvi. 1843.

31. Yellow Hop Trefoil—(*Trifolium procúmbens.*)

Dry pastures, and on the borders of cultivated fields, not uncommon. Very fine near Carrington Moss. Fl. June, July. Annual.

Curtis, i. 190 (as *T. agrárium*); E. B. xiv. 945.

Well distinguished by its oval, hop-like heads of bright-yellow flowers, the size of a marrowfat pea, and by the furrows on the upper petal, when a little over-blown. A beautiful and interesting plant; when luxuriant, eighteen inches high.

32. Little Yellow Trefoil—(*Trifolium minus.*)

Everywhere in meadows and pastures. Fl. all summer. Annual.

Curtis, ii. 345 (as *T. procúmbens*); E. B. xviii. 1256.

33. Least Yellow Trefoil—(*Trifolium filiforme.*)

Among grass, upon lawns, and in dry, grassy lanes, not uncommon. Plentiful in the lane leading from Ringway to Cotterill, and thereabouts; abundant also below the terrace, Worsley Hall, and in fields at Chaddock. (J. E.) Fl. June, July. Annual.

E. B. xviii. 1257.

34. Lucern—(*Medicágo sativa.*)

Occasionally in waste places, on the borders of fields, and among clover, but certainly introduced. Abundant about Strines, and on the banks of the railway between Timperley and Broadheath. Fl. June, July.

E. B. xxv. 1749; Baxter, v. 329.

35. Common Field Medick—(*Medicágo lupulina.*)

Everywhere among leafy green crops. Fl. May—August. Annual.

Curtis, i. 130; E. B. xiv. 971.

A very valuable plant in agriculture, much resembling the little yellow trefoil, but distinguished by its black and rugged legumes.

36. Spotted Medick—(*Medicágo maculáta.*)

Waste places and on heaps of manure, but rare. Prestwich and the neighbourhood (J. P.); Bradford. Fl. May—July. Annual.

Curtis, i. 192 (as *M. Arábica*); E. B. xxiii. 1616 (as *M. polymórpha*).

The leaflets are marked each with a black spot.

37. Toothed Medick—(*Medicágo denticuláta.*)

Waste ground by the canal-side at Timperley, and in similar situations at Bowdon, sparingly. A usual companion of the spotted medick, and probably brought in, like that, with imported cereals. Fl. May, June. Annual.

E. B., Supp. i. 2634.

Mr. Hunt finds the variety *apiculata*, distinguishable by its straight and shorter spines, in company with the normal form at Timperley.

38. Little Bur Medick—(*Medicágo minima.*)

As a weed in John Horsefield's garden, Prestwich. (J. P.) Fl. June, July. Annual.

E. B., Supp. i. 2635.

A few other species are reported wild near Manchester, but require investigation, viz.:—

Yellow Vetch—(*Vicia lútea.*)

In a cornfield near Barton Railway Station. (J. E.)

Curtis, iii. 516.

Small-flowered Melilot—(*Melilótus parviflóra.*)

Sardinian Melilot—(*Melilótus Messanénsis.*)

Both on waste ground at Timperley. (Irvine, p. 667.)

Slender Trefoil—(*Trifólium élegans.*)

On a hedgebank at Prestwich. (J. P.)

The Leguminosæ grown for ornament and economic use, amount to hundreds. Those sown for fodder have been mentioned above; the culinary kinds comprise chiefly the common pea, or *Pisum sativum*; the top-knot pea, or *P. comósum*; the common broad or Windsor bean, botanically *Fába vulgáris*, well known by the black spot on its white flowers; and the two species of French bean,—the dwarf, with a long, straight, and narrow pod (*Phaséolus vulgáris*), and the climbing, or scarlet runner, with a broad and curved pod (*Ph. multiflórus*). The flower garden is enriched by them both in trees and herbaceous plants. The Laburnum, showering down its fine gold, like rain of flowers, and the white Acacia, more correctly called *Robínia*, are the tallest and handsomest; then come

the white Portugal broom, or *Spartium multiflórum;* the yellow Spanish broom, or *S. junceum*, with rush-like, nearly leafless twigs; the bladder senna, or *Colutéa*, with inflated pods resembling little bladders, and several species of *Cytisus*, all more or less shrubby, and excellent for plantations; and after these a host of herbaceous plants,—the sweet-pea, the everlasting-pea, lupines of a dozen different kinds, known at a glance by their digitate leaves; *Coronillas*, species of *Orobus*, *Galega*, *Anthyllis*, *Melilótus*, *Hedysárum*, and many more. The whole of them have butterfly-shaped flowers.

In green-houses, the most conspicuous are the *Acacias*, those charming Australian shrubs and trees, decked in spring with innumerable yellow globes the size of a pea, often exquisitely fragrant, and borne in every variety of inflorescence, from the solitary and axillary up to immense panicles that float in the air

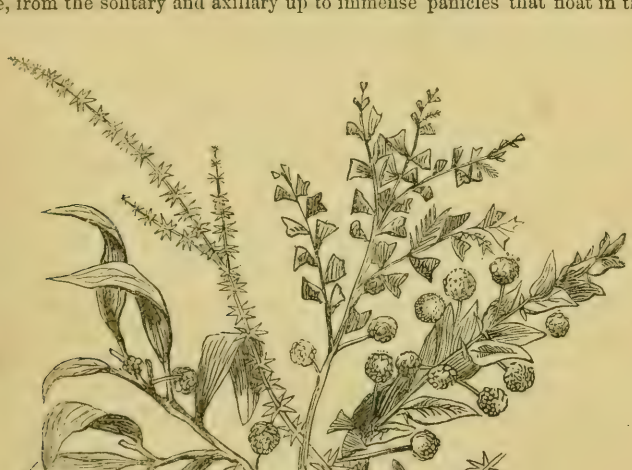


Fig. 126.
Acacias.

like golden clouds; their leaves nearly as various, ranging from the simple and needle-shaped up to the most elaborate doubly-pinnate, as in Fig. 123. The yellow globes are not solitary and individual flowers, but heads of numerous small ones, sessile, and in shape rosaceous, as plainly seen in the unopened buds. The stamens are numerous, giving the delicately fringed and *chenille* appearance so remarkable in these elegant plants, and often unaccompanied by pistils; the bisexual and female flowers being succeeded in due time by long legumes. The marvellous beauty and variety of this exquisite genus of plants can only be estimated, as regards Manchester, by those who have had the privilege of seeing Mr. Yates's noble collection at Sale, where they grow almost to the roof, and

saturate the whole house with their honied odour and golden brightness. The commonest in cultivation is the *Acacia armata*, with abundance of simple, lanceolate leaves, an inch and a half long, and solitary, axillary globes of flowers, copiously produced on the upper part of the branches.

Next to the Acacias come a multitude of pretty shrubs belonging to the genera *Chorizéma, Pultenæa, Eutáxia, Kennédya*, &c., mostly with simple, and often holly-edged leaves: and overhead the *Wistaria*, which seems a copy of the laburnum in lilac. Least conspicuous of any, as to flowers, but the most remarkable of the whole family, in the green-house, are the *sensitive plants*,—the *Mimósa sensitíva* and the *Mimósa púdica*, the leaflets of which droop directly they are touched. In very good collections may also be seen the "moving-plant," or *Desmódium gyrans*, whose clover-like leaflets keep slowly rising and sinking, independent of any stimulus from without.

L.—THE LADY'S-MANTLE FAMILY. *Sanguisorbáceæ.*

Herbaceous plants (except a few foreign ones, which are undershrubby), with alternate, stipulate leaves, generally on long petioles when fully grown, and either simple and fan-lobed, and plaited like a lady's fan, or interruptedly-pinnate. Perianth single, with a thickened tube, and a three, four, or five-lobed margin, the four-lobed being most usual. Stamens usually four; ovary solitary, and containing a single ovule. The flowers are sometimes unisexual. Being small and inconspicuous, they would often be passed by, were it not that the inflorescence is usually dense, and often capitate, rendering the plants in many cases extremely pretty. They grow in fields, on heaths, and exposed places in most parts of the world outside the tropics, to the number of one hundred species or more, and are noted for their astringency. Five occur wild in England, and three of them near Manchester, all having a four-lobed perianth and four stamens.

1. Flowers purplish-red, in dense terminal spikes, an inch or more long. Stems two to three feet high, branched at the upper part. Leaves large, elegantly pinnate; the leaflets oval and serrate, with smaller ones between .... } Common Burnet.

2. Flowers green, minute, in terminal, often sessile, corymbs; leaves fan-veined, and fan-lobed, serrate, very elegant, the lower ones on long stalks; stems three to eighteen inches high ..... } Common Lady's Mantle.

3. Flowers green, minute, axillary, and sessile; three of the four stamens sometimes absent. Leaves sessile ..... } Parsley Piert.

HABITATS AND LOCALITIES.

1. Common Burnet—(*Sanguisórba officinális.*)

Moist, rich meadows by rivers. Abundant near the Mersey, at Northen; by the Tame, opposite Arden Hall; in the valley of the Irwell, and about Strines. Fl. August.

E. B. xix. 1312; Baxter, iv. 269.

2. Common Lady's Mantle—(*Alchemílla vulgáris.*)

Meadows and pastures, common. Particularly fine about Clifton, Prestwich, in the valley of the Tame, and about Mobberley. Fl. May—August.

Curtis, iv. 588; E. B. ix. 597; Baxter, iv. 280.

3. Parsley Piert—(*Alchemílla arvénsis.*)

Cultivated fields and waysides, common and insignificant. Fl. May—August. Annual.

E. B. xv. 1011.

Two of the most elegant of our native plants belong to this family, and though nowhere spontaneous in the neighbourhood, are within reach, in a state of cultivation. These are the alpine lady's mantle, or *Alchemílla alpina*, (E. B. iv. 244.) and the salad-burnet, or *Potérium Sanguisorba*. (Curtis, i. 137; E. B. xii. 860.) The former is a bushy little plant, with leaves as represented in Fig. 28 (p. 16), white and soft in every part, but on the underside of the leaves remarkably so, the surface resembling the finest white satin. The salad-burnet has long, narrow, pinnate leaves, the leaflets rounded and serrate; the stamens and pistils in separate flowers, and both kinds in globular heads. Both plants are confined, or nearly so, to rockeries. The *Sanguisorba Canadénsis*, and a *Potérium* with prickly heads, occur in a few collections.

LI.—THE APPLE FAMILY. *Pomáceæ.*

Trees and shrubs exclusively, the stems often spinous. Leaves alternate, stipulate, usually undivided, sometimes pinnate or pinnatifid, and generally serrate. Flowers regular, solitary, or in terminal clusters; petals five, seated along with the numerous stamens, on the upper part of the calyx, which combines with the two to five adherent ovaries, and crowns them, remaining in a withered state upon the summit of the ripened fruit. The latter is more or less like an apple, though sometimes not larger than a pea; the ovules in pairs, and side by side. The last-named character is peculiar, and distinguishes the family from those with which it is immediately connected. The

copious and beautiful blossoms, which are crimson, pink, or white, but never blue, form one of the chief ornaments of spring and early summer. The fruits are in many cases of eminent value, comprising, among others, the apple, the pear, the quince, and the medlar. Cider and perry, the wood of the pear-tree and of the white-beam, and the mucilaginous seeds of the quince, bear further witness to the usefulness of the family. Geographically, it belongs to the whole of the northern hemisphere, except the extremely cold parts, diminishing, however, as the south is approached, and on the other side of the equator is entirely unknown.

The number of species is about two hundred, nine growing wild in England, and three of them near Manchester.

A.

Branches abounding with sharp thorns.

1. Leaves feather-lobed, in three to five deep segments, glabrous; flowers corymbose, white, and fragrant ..... } Hawthorn.

B.

Thornless.

2. Leaves oval, undivided, serrate; flowers in sessile umbels, petals usually flushed with pink..... } Wild Apple.

3. Leaves pinnate, the leaflets numerous, lanceolate, and serrate; flowers in large corymbs, cream-coloured, and highly fragrant } Mountain Ash.

HABITATS AND LOCALITIES.

1. Hawthorn—(*Cratægus Oxyacántha.*)

Planted everywhere for hedges. Apparently wild in Stalybridge Brushes and at Charlesworth Coombs. Fl. May, June.

E. B. xxxv. 2504; Baxter, ii. 118.

This is the lovely "May" which in early summer dapples every hedgerow with flakes of white and odorous bloom, the buds having already been foremost to grow green and announce the spring. In hedges, however (for which it is invaluable), the proper character of the plant is suppressed, through the clipping and imprisonment. It is only when standing independently, as in a park, or on a lawn, or in the open spaces of a wood, where it can spread its branches freely, and form the large round head characteristic of the species, that its proper altitude and symmetry are attained, and then it is often one mass of snowy bloom, and the very perfection of a canopy for a rustic seat. Burns never drew a finer picture than when he placed the "youthful, loving, modest pair"

"Beneath the milk-white Thorn that scents the evening gale."

The pink-flowered hawthorn, one of the most beautiful trees in cultivation, the double flowered, and the variegated-leaved, all common in gardens and shrub-

berries, are varieties of the *Oxyacántha*. A bough of the first-named often vindicates the original nature, by producing *white* flowers, making it appear as if a piece of the common wild May had been thrown among the branches. The anthers of the hawthorn are pink when the flower expands, but subsequently change to black.

2. Wild Apple—(*Pyrus Málus.*)

Hedges and thickets, frequent, especially about Cheadle and Baguley. Fl. April, May.

E. B. iii. 179.

This is the origin of our garden apples, all of which are varieties that have sprung up under cultivation.

3. Mountain Ash—(*Pyrus Aucupária.*)

In woods, and on banks of streams and rivers, where it can lean over the water, loving especially the rocky sides of little cascades. Undoubtedly wild at Alderley, on the top of Werneth Lowe, and at Seal-bark, Greenfield, in a place called, from its abundance, the "Wicken-hole." Fl. May, June.

E. B. v. 337.

Planted everywhere for ornamental purposes, few trees exhibit two such strikingly different aspects of beauty as the mountain-ash, viewed in the spring and in the autumn. In May and June it is green, light, and graceful, and loaded with cream-coloured bloom, the exuberant joy of its youth; then for a time it is unattractive, and we almost forget it, but in September it again becomes conspicuous, and with a magnificence of fruitage, first of a deep orange colour, and when ripe, of a rich vermilion, that attracts the most indifferent and incurious.

> "The mountain ash
> No eye can overlook, when 'mid a grove
> Of yet unfaded trees she lifts her head,
> Decked with autumnal berries, that outshine
> Spring's richest blossoms."

Several fine specimens of this handsome tree stand by the approach to Lyme Park, on the right-hand side.

The garden species of the Pomaceæ, after the apple, the pear, the quince (not rare in good gardens in Cheshire), and the medlar, (E. B. xxii. 1523.) which frequently occurs about Bowdon and Baguley, and brings its fruit to perfection every year, are limited to ornamental kinds, and nearly all are exceedingly common. The *Pyrus Japonica*, usually trained against walls, opens its large crimson or blush-coloured corollas as early as March; the *Pyrus Aria*, or white-beam, (E. B. xxvi. 1858.) and the *Pyrus hybrida*, (E. B. xxxiii. 2331.) are handsome shrubbery and plantation trees, with feather-veined leaves, broad, oval, and un-

divided in the *Pyrus Aria*, and the upper half pinnatifid in the *Pyrus hybrida*, and in both cases remarkably white underneath; the *Pyracantha* is almost as common against walls as the *Pyrus Japonica*, its abundant orange-red berries lasting, along with the leaves, throughout the winter, and making a house-front look quite cheerful; while mixed with other low-growing shrubs is very commonly seen the *Cotonéaster microphylla*, a stiff, sturdy little bush, with small, evergreen leaves, white and star-like flowers, and solitary crimson berries that look like drops of blood among the foliage. The remainder comprise various handsome species of thorn or *Cratægus*, distinguished by their spines and large stipules; and different kinds of *Méspilus* and *Cotonéaster*. The most frequent is the *M. Canadénsis*, a small tree with pendulous racemes of white flowers, blooming in April, and leaves that in autumn become stained with the most vivid scarlet, while in the uncoloured portions still as green as when they expanded.

LII.—THE PLUM FAMILY. *Drupáceæ* or *Amygdáleæ*.

Trees and shrubs, with simple, undivided, oval, or lanceolate leaves, usually serrated, and glandular towards the base; flowers of five distinct petals, inserted along with twenty or more stamens, on the rim of the calyx, which is cup-shaped and five-lobed, and encloses the free and solitary ovary. The latter ripens into a "drupe," that is to say, a bony shell, enclosing the seed, itself being embedded in soft pulp, overlaid by a coloured and separable skin, as in the plum and the cherry. As in the Apple Family, from which the present is distinguished only by its fruit and secretions, the flowers are lively pink or white, never blue, borne singly or in sessile umbels, and among the earliest to open in the spring, when the rude gusts often wrench away their petals as soon as opened, and strew the ground with them as if with snow.

Natives almost exclusively of the cold and temperate regions of the northern hemisphere, few families supply those parts of the world with a greater variety of agreeable fruits, as witness the plum and cherry, already mentioned (the former including the damson and the greengage), the peach, the apricot, and the nectarine, the whole, in short, of our "stone-fruits." Besides these, there are the almonds, both sweet and bitter, different, as fruits, from the preceding, only in the large size and nutty character of the seeds, and in the scantiness and uselessness of the exterior pulpy portion. Almost all the species contain abundance of hydrocyanic or "prussic" acid, stored either in the leaves or in the kernels. It is this which gives the peculiar flavour

to the leaves of the common laurel, and occasions them to be used in making custards, while it explains the deadly properties of "laurel water." It is the same secretion which recommends the kernels of stone-fruits for ratafia and other articles of confectionery. The bark, in several instances, yields gum, familiar in the oozings from the sores of plum-trees, and in the transparent tears of the garden cherry, hanging from the boughs like amber icicles.

About a hundred species are known, six growing wild in England, and four of them near Manchester, all with white flowers.

1. Flowers in axillary, pendulous racemes of three to four inches in length, and fragrant; a small but graceful tree	Bird Cherry.
2. Flowers in umbellate, nearly sessile, clusters, the peduncles at least an inch long; a tree often attaining considerable height, and bushy at the upper part	Wild Cherry.
3. Flowers solitary, nearly sessile, appearing before the leaves, which are glabrous; a stiff, hard, much branched, very thorny bush, or small tree	Black-thorn.
4. Flowers in pairs, cotemporaneous with the young leaves, the latter downy on the under side; habit of growth like the preceding, but taller and less thorny	Wild Plum.

There is good reason to believe that the two last-named are but forms of a single species, the black-thorn being, perhaps, the normal state; and that even the cultivated plum, or *P. doméstica*, with its innumerable varieties, is a descendant of the same original stock.

HABITATS AND LOCALITIES.

1. Bird Cherry—(*Prúnus Pádus.*)

Woods and hedges. Agecroft, Blakeley, and abundant in the Reddish Valley and near Marple Aqueduct, growing tall and elegantly. Fl. May, June.

E. B. xx. 1383.

The racemes bear a good deal of resemblance to those of the Portugal laurel, but are drooping instead of erect, as in the latter species.

2. Wild Cherry—(*Prúnus ávium.*)

Woods and thickets, especially on their borders, common. Prestwich Dells; Dunham; Lymm, abundant about the upper end of the Mere, and ripening its fruit plentifully; Arden; Marple; Ashley, and between the latter and Cotterill Clough, on the borders of the swift-flowing Bollin, abundant and beautiful, and shewing its fondness

for the brows of steep, overhanging banks, where it can tower in its snowy pride. Fl. April, May. Fruit ripe in August.

E. B. x. 706; Baxter, ii. 100 (both as *Prúnus Cérasus*).

The true *Prunus Cérasus* (E. B., Supp. iii. 2863.) is quite a different tree, seldom exceeding eight feet in height, whereas the *avium* rises to thirty or forty.

3. Black-thorn or Sloe—(*Prúnus spinósa.*)

Hedges, everywhere; its immaculate white flowers anticipating the leaves, and giving one of the first indications of the approach of spring. Fl. March, April.

E. B. xii. 842.

The fruit rarely ripens near Manchester, nor anywhere so well, perhaps, as near the sea. At Clevedon, twelve miles south-west of Bristol, where the breeze off the channel turns every bush into half an arch, and the salt spray is their daily visitant, not a flower seems to fail, the round plums, covered with beautiful purple "bloom," being well-nigh as plentiful as the leaves. The plant takes the rather odd name of "*black*-thorn" from the circumstance of its leaflessness when the flowers open.

4. Wild Plum—(*Prúnus insititia.*)

Woods and hedges, but not common. Levenshulme (in fruit). Between Bowdon old Church and the Chester Road. Frequent about Leigh. (J. E.) Formerly common at Prestwich. (J. P.) Fl. April.

E. B. xii. 841.

The almond, or *Amygdalus communis*, opening its pink flowers before the leaves, and ripening its fruit moderately well in average seasons, is a common and favourite ornament of plantations; but neither so plentiful nor so conspicuous as the white-flowered and evergreen laurels,—the Portugal, or *Prunus Lusitánica*, and the common laurel, or *P. laúro-cérasus*, the little plums of which often ripen towards October. The palm of beauty belongs to the double-blossomed cherry, which only wants perfume to rival the white rose. The peach, or *Pérsica vulgáris*, the nectarine, or *P. lævis*, and the apricot, or *Armeniaca*, all do well southwards, but elsewhere indifferently. Cherries, plums, and damsons, especially the latter, are produced in abundance, Cheshire being the chief seat of their cultivation.

It is interesting to observe, with the quick-eyed and poetical Linnæus, that all our most precious fruit-trees are contained in this and the preceding family, and that (omitting the peach, which is a foreign luxury rather than a household fruit), the flowers, with the exception of the apple, are white as milk. Those of the pear, the quince, the plum, the cherry, the damson, the greengage, are pure white; so are the blossoms of the medlar and the apricot, and among small plants, those of the raspberry and the strawberry. All bloom, moreover, in the spring, and nearly together, Pomona's virgin wedding robes, the apple, most precious of all, disclosing her blushes.

LIII.—THE ROSE FAMILY. *Rosáceæ.*

Chiefly perennial, herbaceous plants, only a few genera being shrubby, and scarcely any species arborescent. Stems in the shrubby kinds often clothed with acute and curved prickles, which extend to the petioles, to the under side of the veins of the leaves, and to the peduncles. Leaves alternate, usually stipulate, either compound and pinnate, or somewhat quinate; or simple, and then either ternate, pinnatifid, or undivided. Many, like the *Sanguisorbas* in the Lady's-Mantle Family (page 186), have the leaves "interruptedly pinnate," a peculiarity of form represented in Fig. 127. Flowers regular,

Fig. 127.

Fig. 128.

Fig. 129.
Thorns of Rose.

pentamerous, calyx often ten-cleft; petals five; stamens twenty to a hundred, inserted on the calyx, and curved inwards while young; the ovaries equally numerous, and free. In the true roses the calyx is tubular and urn-shaped at the lower part, enclosing the ovaries and styles, while the upper part spreads into five, often pinnatifid, divisions, making it appear as if the flower were epigynous or "superior." Many species are highly fragrant; red, white, and yellow are the predominant colours; blue is altogether unknown. The cinquefoils and several others bear a good deal of resemblance to ranunculaceous plants, and to buttercups especially. They are immediately distinguished by their stamens being inserted on the calyx, those of the Ranunculaceæ being seated on the receptacle. The only important exceptions to the above characters occur in the tormentils, which usually have tetramerous flowers, and in agrimony, where the stamens rarely exceed ten. The peculiarly elegant and symmetrical form of

the flower in the normal species, is the ground of the term "rosaceous," applied to corollas. (Fig. 131.)

The fruits of the Rosaceæ are diversified very curiously. The Spiræas have little, whorled, many-seeded follicles. Those of the roses are small, dry, hard, and hairy achenia, enclosed in the urn-like half of the calyx, which constitutes their permanent envelope, and becomes succulent and red, the whole being called a "hip." In the strawberry the receptacle swells enormously while the ovaries are ripening, and forms a juicy cushion, on which they appear seated like minute yellow seeds. (Fig. 130.) In the blackberry and the raspberry the receptacle remains dry, but enlarges into a white and spongy cone, the ovaries now taking their turn to become juicy, and crowding its surface in the shape of little beads, that adhere by their edges. (Fig. 132.) Lastly, in the cinquefoils and their allies, both receptacle and ovaries are dry, as if the raspberry had exchanged its juicy grains for the hard and bony achenia of the strawberry, the succulence altogether or nearly dispensed with. In these latter it often happens that the carpels are provided with long hairy tails, like those of the *Clématis* and the pasque-flower, suggesting further comparison with the Ranunculaceæ; as the *Spiræas* do in their follicles, when we think of the columbine and larkspur; and as the *Potentillas* do, in their heads of dry achenia, when placed alongside of the crowfoot and the wood-anemone.

Fig. 130.
Strawberry.

Fig. 131.
Rosaceous flower.

Fig. 132.
Blackberry.

The prickles of the Rosaceæ, or of roses and brambles, are quite a different thing from the spines of the sloe and the thorns of the berbery, which differ also one from the other. A shrub or tree is "armed," as botanists call it, in several different ways. Sometimes a twig ceases from its onward growth, and tapers off to a sharp point, forming a spear, which is continuous with the stem, and inseparable from it, except by amputation. This is the case with the sloe, the

hawthorn, and the members of the genera *Prunus* and *Cratægus* generally, as well as in the *Ononis*, and to spears of such origin the name of "spine" is alone properly applicable. In other plants Leaves have their development arrested, the woody matter that would have composed the skeleton, or a portion of it, contracting into acute needles like those of the berbery. These are examples of "thorns," properly so called; the thorny stipules of the *Robinia*, and the thorns of that vegetable hedgehog, the furze-bush, coming under the same general idea and denomination. The thorny edges of fully developed leaves, such as the holly, are very little different, being prolongations of the superabundant woody matter of the skeleton. But in the prickles of roses and brambles, we no longer have organic connection with the subjacent woody tissues of the plant. The weapons of these shrubs are simply hairs, grown immensely thick and strong, attached no deeper than the surface of the skin or bark, and separable from it by mere pressure on one side, when they come away, and leave only a little scar. (Fig. 129.) In other words, prickles are superficial, while spines and thorns are seated in the very substance of the plant.

Five hundred Rosaceæ have been discriminated, belonging almost entirely to the temperate and cold countries of the northern hemisphere, and remarkable alike for the delicious quality of their fruits when succulent;—for the fragrance of their leaves when smell is present, and for the very general presence of an astringent principle. A few are emetic and anthelmintic, but not a single discovered species is deleterious.

In England there grow wild of this family twenty-four universally admitted species, and a considerable number of roses and brambles, concerning which opinions are divided. The members of these two thorny genera are exceedingly prone to sport into varieties, and probably to produce hybrids. At all events, there are numerous forms which some botanists deem original species, and others only derivations, scarcely two observers being agreed upon either point, or how many there are of each. For my own part I regard the genuine indigenous species of *Rubus* as not exceeding seven, but certainly amounting to that number, and those of the genus *Rosa* as about the same. Assuming this view to be correct, it will make thirty-eight Rosaceæ in all, natives of our country, and give to the Manchester Flora twenty-one. I insert the characters only of such forms as I believe to be genuine and originating species, but the names and localities of all that are asserted, and which grow in our neighbourhood.

SECTION 1.

Stems and petioles destitute of prickles.

A.—Flowers red or purple.

Lower leaves lyrate; petals tawny-red; achenia with hairy tails, bent in the middle, and hooked at the tip. ..... 12. RED AVENS.

Lower leaves pinnate, with five or seven oblong deeply-serrated leaflets; petals deep reddish-purple; achenia without tails ..... 14. WATER SEPT-FOIL.

B.—Flowers of a decided yellow.

Stems decidedly erect.

Flowers terminal, solitary; achenia with hairy tails, bent in the middle, and hooked at the tip. Lower leaves lyrate; upper ones ternate .... 13. YELLOW AVENS.

Flowers in slender spikes, six to twelve inches long; calyx covered with hooked bristles; leaves irregularly pinnate ..... 21. AGRIMONY.

Stems wire-like, more or less prostrate and trailing.

Leaves interruptedly pinnate, white and silky, the leaflets deeply serrate. Flowers axillary and solitary ..... 17. SILVERWEED.

Stems rooting at the joints; leaflets five, obovate; flowers usually pentamerous ..... 18. COMMON CINQUEFOIL.

Stems not rooting at the joints; flowers usually tetramerous.

Stems sparingly branched ..... 19. LARGE TORMENTIL.

Stems repeatedly forked, and bushy, somewhat erect at the upper part ..... 20. COMMON TORMENTIL.

C.—Flowers white, greenish-white, or cream-coloured.

Flowers in large loose panicles, very fragrant.

Stem two to four feet high, branched above. Leaves lyrate, and interruptedly pinnate, white underneath ..... 11. MEADOW-SWEET.

Flowers solitary, or not more than five or six together, and then corymbose.

Leaves ternate or trifoliolate.

Calyx ten-cleft, the outer lobes smaller; achenia dry and bony.

Flowering stems erect, two to six inches high. Plant with long runners. Fruit juicy.... 15. WILD STRAWBERRY.

Flowers nestling among the leaves. Plant without runners. Fruit juiceless..... } 16. LITTLE MOCK STRAWBERRY.

Calyx five-cleft; petals greenish-white; achenia few, red, and juicy ..... } 9. LITTLE ROCK BRAMBLE.

Leaves simple, round, or kidney-shaped, often five, seven, or nine-lobed: calyx five-cleft; flowers solitary, terminal, and unisexual; achenia few, juicy, and orange-red ..... 10. CLOUDBERRY.

SECTION 2.

Stems and petioles more or less prickly.

A.—Calyx urn-shaped, contracted at the orifice; the lower portion enclosing the ovaries, which are hard and hairy, and becoming a red and succulent "hip" as they ripen. (Genus *Rosa*.)

Calyx and hips smooth; prickles strongly hooked.
Styles distinct, included, or nearly so, in the tube of the calyx; flowers usually pink; hips egg-shaped ..... 1. COMMON DOG-ROSE.
Styles united into a long, smooth column, and mostly exserted; flowers white, often yellow at the base; hips globular ..... 2. WHITE DOG-ROSE.
Calyx and hips rough with bristles; prickles nearly straight; leaves downy; flowers deep pink.... 3. HAIRY-FRUITED DOG-ROSE.

B.—Calyx flat and spreading, permanently green and leafy; pistils forming a conspicuous tuft in the centre; achenia juicy. (Genus *Rubus*.)

|| *Stems shrubby.*

Stems erect, or nearly so, glaucous. Leaves pinnate, with five to seven serrated leaflets, white underneath; flowers drooping; petals not longer than the calyx; fruit crimson ..... 4. WILD RASPBERRY.
Stems more or less arched or trailing; leaves ternate and irregularly quinate.
Stem round, glandular, hairy; panicle nearly simple; fruit glaucous, of very few achenia..... 8. DEWBERRY.
Stem angular; fruit not glaucous.
Leaves white, with soft down underneath; lower leaflets separate and retroflexed ..... 5. LINNÆAN BLACKBERRY.
Leaves green on both sides, or nearly so.
Stem rough with hairs and glands; lower leaflets usually stalked ..... 7. GLANDULAR BRAMBLE.
Stem smooth, or nearly so; lower leaflets sessile, and overlapping ..... 6. HAZLE-LEAVED BRAMBLE.

||| *Stems herbaceous.*

Petals greenish-white; achenia few, and red; leaves ternate; stem six to ten inches high ..... 9. LITTLE ROCK BRAMBLE.

HABITATS AND LOCALITIES.

1. COMMON DOG-ROSE—(*Rósa canina.*)

Hedges and thickets, everywhere. Fl. June, July.

Curtis, ii. 326; E. B. xiv. 992.

There is very commonly seen upon the branches of the wild-rose, and sometimes upon the leafstalks, a pretty little tuft resembling green moss, which, as the season advances, turns vivid crimson. The heart of it is solid, and serves as

a nest for a number of minute grubs, the eggs from which they proceeded having been deposited in the bark by an insect-magician called *Cynips*. The sap exudes where the eggs are placed, and gradually forms this beautiful protection for them. By mid-winter the mossy character is gone; a brown lump alone remains, with apertures in it by which the creatures have made their exit.

2. White Dog-rose—(*Rósa arvénsis.*)

Hedges, thickets, and on the borders of fields, everywhere, adorning them with beautiful creamy bloom, quite different from that of the preceding. Fl. June, July.

Curtis, iii. 495; E. B. iii. 188; Baxter v. 325.

3. Hairy-fruited Dog-rose—(*Rósa villósa.*)

Hedges and woods, rather uncommon. Frequent near Blakeley, Clifton, Prestwich, and Stand. Found also about Withington. Fl. June, July.

E. B. ix. 583.

Downy-leaved Dog-rose—(*Rósa tomentósa.*)

Common about Leigh (J. E.), and about Withington; sparingly at Clifton, where the late John Horsefield first noticed it in this neighbourhood.

Curtis, iii. 496; E. B. xiv. 990.

4. Wild Raspberry—(*Rúbus Idæus.*)

Woods, thickets, and in rough-edged lanes; also on the borders of moors, and in bushy places, plentiful everywhere. Mere Clough; Summerseat woods; Warburton Moss, near Lymm, in the greatest profusion. Fl. May, June. Fruit ripe in August.

E. B. xxxiv. 2442.

5. Linnæan Blackberry—(*Rúbus fruticósus.*)

Hedges and by waysides, tolerably frequent, but not the commonest bramble of the district. Fl. July, August.

E. B. x. 715; Baxter, v. 334.

White-stalked Bramble—(*Rubus leucostachys.*)

Plentiful in the Reddish and Haughton Valleys; also about Marple, Cotterill, and between Bowdon new Church and Carrington. Fl. July, August.

E. B., Supp. i. 2631.

Remarkable for its large, circular, leathery leaflets; long, contracted panicles, and large flowers.

VILLOUS BRAMBLE—(*Rubus villicaulis.*)

Plentiful in and about Bredbury Wood, near Hyde, and in the vicinity of Clifton. Fl. July, August.

BROAD-LEAVED BRAMBLE—(*Rubus macrophyllus.*)

Alderley Edge. Common about Wilmslow and Capesthorne Mere. Fl. July, August.

E. B., Supp. i. 2625.

BUCKTHORN-LEAVED BRAMBLE—(*Rubus rhamnifolius.*)

Hedges and thickets, common. Fl. July—September.

E. B., Supp. i. 2604.

Distinguished by its flat and rounded leaflets, and the rosy tinge of the petals.

LARGE-FRUITED BRAMBLE—(*Rubus affinis.*)

Hedges and thickets, common. Fl. August.

6. HAZLE-LEAVED BRAMBLE—(*Rubus corylifolius.*)

In hedges and waste places, everywhere; the common bramble of the district, and the first to come in bloom. Fl. July—September.

E. B. xii. 827.

RED-FRUITED BRAMBLE—(*Rubus suberectus.*)

Damp woods and heathy places, frequent. Plentiful in Mere Clough, and on the borders of Carrington Moss. Fl. July, August.

E. B. xxxvi. 2572.

This may, perhaps, prove to be a distinct and typical form.

UPRIGHT BRAMBLE—(*Rubus plicatus.*)

Hedges, not rare. Plentiful on Alderley Edge, about Mobberley, and in the neighbourhood of Sale. Fl. July, August.

E. B., Supp. i. 2714.

SHINING-STALKED BRAMBLE—(*Rubus nitidus.*)

Hale Moss; valley of the Tame; near Hough End; Mobberley. Fl. July, August.

HORNBEAM-LEAVED BRAMBLE—(*Rubus carpinifolius.*)

In hedges, frequent. Abundant about Bowdon, and in the Reddish and Haughton Valleys. Fl. July, August.

E. B., Supp. i. 2664.

See the remark on *R. suberectus*, which may also be applied here.

HEDGE BRAMBLE—(*Rubus vulgaris.*)

In hedges, frequent. Common about Withington and Chorlton. Fl. July, August.

7. GLANDULAR BRAMBLE—(*Rubus glandulósus.*)

Hedges and waste places. Abundant in the valley of the Tame. Fl. July, August.

E. B., Supp. iii. 2883.

LARGE-PETALED BRAMBLE—(*Rubus Radula.*)

Haughton, on the banks of the Tame. (Mr. J. Sidebotham.)

KŒHLER'S BRAMBLE—(*Rubus Kœhleri.*)

Hedges and thickets, common.

E. B., Supp. i. 2605.

HAIRY BRAMBLE—(*Rubus hirtus.*)

Haughton. (Mr. Sidebotham.)

VARIOUS-LEAVED BRAMBLE—(*Rubus diversifólius.*)

Haughton Dale, Mobberley, and common about Bowdon.

Remarkable for the diversity in the shape of its leaflets, scarcely any two being alike.

SYLVAN BRAMBLE—(*Rubus sylváticus.*)

In woods only. Bredbury Wood, near Hyde, abundant. Fl. July—September.

Immediately known by its delicate stem, and the pretty rose-colour of the flowers.

The preceding, from No. 5 downwards, are, with the non-botanical, simply "blackberries;" and truly, in the present instance, the non-botanical seem nearer the mark in their estimate of species than more than one author who might be named. The larger kinds are ornamental without exception, following the roses in their bloom; a beautiful object when the panicles of their jetty fruit assume the dye of ripeness; and again when their foliage crimsons for decay, and glows in the light of a sunny autumn afternoon.

8. DEWBERRY—(*Rúbus cæsius.*)

Hedges and thickets. By the roadside at Longford, plentiful; equally so on the banks of the Irwell, near Clifton Aqueduct, and in the vicinity of Capesthorne. Fl. June, July.

E. B. xii. 826.

Immediately distinguished by the fruit, which consists of a very few large achenia, half concealed by the erect calyx.

9. Little Rock-bramble—(*Rúbus saxátilis.*)

On rocks at Coal-bank and Simpson Clough Bridge, both in Bamford Wood, between Heywood and Bury, plentiful; also on Kinder Scout. Fl. June.

Curtis, iv. 617; E. B. xxxii. 2233.

10. Cloud-berry—(*Rúbus Chamæmórus.*)

Elevated moorlands. Greenfield. Abundant on the top of Kinder Scout; and on Rollick-stones and other moors near Woodhead. Fl. June; ripening its large and shewy berries in September.

Curtis, iii. 494; E. B. viii. 716.

Like the hautboy strawberry, this plant has unisexual flowers, and is apparently diœcious; but the stems which bear the male and female flowers respectively, seem to be united underground, making it in reality monœcious.

11. Meadow-sweet—(*Spiræa Ulmária.*)

Moist ditches and borders of ponds, among willowherbs and rushes, common everywhere. Fl. July, August.

Curtis, ii. 325; E. B. xiv. 960.

A plant universally pleasing, from its light and elegant form, and the delicious hawthorn-like scent of its plentiful blossoms. Many call it the "Queen of the Meadows."

12. Red Avens—(*Géum rivále.*)

Moist places in woods and thickets, and on the banks of rivers where shaded by trees, but rather infrequent. Mere Clough; Blakeley; Botany-Bay Wood; Little Hulton (G. H.); damp meadows between Eccles and Hope (J. S.); river bank between Agecroft and Clifton; Ashley; and in the Capesthorne district, plentiful. Fl. May, June.

E. B. ii. 106; Baxter, i. 3.

Common in gardens.

13. Yellow Avens—(*Géum urbánum.*)

In woods, and on dry, shady hedgebanks, especially by waysides, common. Fl. May—July.

Curtis, i. 109; E. B. xx. 1400.

14. Water Sept-foil—(*Comárum palústre.*)

On the plashy borders of ponds, and not merely fringing their edges, like mints and willowherbs, but extending to where the water is ten or fifteen inches deep, common. Fl. July.

E. B. ii. 172; Baxter, iii. 197.

A very curious, elegant, and interesting plant, the interior of the sepals, like the petals, of a dark purplish-red; the leaves glaucous, and formed of five or seven large serrated leaflets; and the fruit resembling a juiceless strawberry.

15. Wild Strawberry—(*Fragária vésca.*)

Hedgebanks, and in the dry parts of woods, abundant everywhere. Fl. May, June. Fruit ripe in July.

E. B. xxii. 1524; Baxter, iv. 242.

The garden strawberry is the *Fragaria elátior.* (E. B. xxxi. 2197.) Whether distinct as a species from the *vesca* is more than doubtful, no differential characters being discoverable in it beyond the greater size, the fewer runners, and a strong disposition to produce unisexual flowers.

16. Little Mock Strawberry—(*Potentilla Fragariástrum.*)

Everywhere on dry hedgebanks, the earliest of the thin-strewn flowers of spring. Fl. February, March.

Curtis, i. 175; E. B. xxv. 1785 (both as *Fragária stérilis*).

This little plant is very commonly mistaken for the wild strawberry. But the latter seldom blossoms before May, and has flowers twice or thrice as large, and lifted, three or four together, on stalks as many inches high; whereas those of the mock strawberry crouch among the leaves. The strawberry is further distinguishable by the yellowish-green of its foliage, which in the other plant is dark and somewhat sombre, and by having petals without the notch at the extremity, usually observable in the *Fragariástrum.* By the older botanists it was placed in the same genus as the strawberry, as indicated in the synonyme, the absence of the succulent receptacle being expressed in the specific name *stérilis* or "barren."

17. Silverweed—(*Potentilla anserína.*)

Roadsides, and in poor, dry, waste ground, often by heaps of cinders, abundant everywhere. Occasionally upon hedgebanks, and then more luxuriant. Fl. June, July.

Curtis, i. 176; E. B. xii. 861.

One of the most charming of our native plants, whether in the silvery feathers of its foliage, or in the bright golden lustre of its scented blossoms, which lie close upon the ground (unless when the plant is drawn up by taller ones), and bear a strong resemblance to buttercups. The petals expand only in clear weather and in sunshine; and in autumn the leaves assume a fine yellow tint.

18. Common Cinquefoil—(*Potentilla réptans.*)

Hedgebanks and waysides, chiefly on the south-side of the town. Common about Chorlton, Gorton, and Reddish. Fl. June—August.

Curtis, i. 37; E. B. xii. 862 (but rarely so much creeping as there represented).

19. Large Tormentil—(*Tormentilla réptans.*)

Hedgebanks and in woods, common. Fl. June, July.

E. B. xii. 864 (but rarely so upright or decidedly panicled).

20. Common Tormentil—(*Tormentilla officinális.*)

Moors, heaths, on banks, and in dry woods, common everywhere. Fl. June, July.

Curtis, ii. 327; E. B. xii. 863; Baxter, v. 341.

A pretty, unpretending little plant, known immediately by its cross-shaped golden flowers, borne singly, instead of in clusters, like all other yellow cross-shaped flowers, and by the long thread-like stems, with ternate or quinate leaves, and generally entangled among other little herbs.

21. Agrimony—(*Agrimónia Eupatória.*)

Pastures and dry waste places, rather rare. By Riddings Brook, Lymm; plentiful near Rostherne Mere; about Mobberley (Mr. Holland); in Coutacre Clough, Middle Hulton (G. H.); and in Crookley Wood, near Stockport. (Mr. Isaac Williamson.) Hope, near Eccles (J. S.); Rainsall, and Broughton. (J. P.) Bramhall; Bredbury; between Hagden and Bollington, plentiful. (Mr. John Moss.)

Curtis, ii. 324; E. B. xix. 1335; Baxter, ii. 88.

An elegant and interesting plant, with flowers that smell like apricots.

The grand contribution of the Rosaceæ to garden ornament hardly needs to be named. The rose, in its odour and loveliness, has in every age been the acknowledged queen of flowers, the metaphor of perfection, another name only for whatever in nature is most delightful of its kind. A good many species are in cultivation, but the thousands of "sorts" with fancy names, are but varieties obtained by the skill of the cultivator. The best-marked are the old-fashioned double-red, or "cabbage-rose,"—the *Rosa centifólia*, of which the moss-rose is a variety; the monthly-rose, trained against walls; and the little Banksian rose, with clusters of yellowish flowers like carnations. Sweet-briar is the *Rosa rubiginósa.* (Curtis iii. 497.) After this beautiful genus come various species of *Spiræa*, some shrubby, with close panicles of small pink blossoms; others herbaceous, with flowers resembling those of the meadow-sweet, or *S. Ulmaria.* Such are the *Spiræa Aruncus, trifoliata,* and *Filipendula,* (Curtis iii. 493.) a very elegant native. The flowers of the last-named are often double. *Spiræa opulifólia* attains the stature of a small tree. *Potentillas*, with flowers like those of

the strawberry, red, puce-coloured, or yellow, and foliage somewhat of the same form, are also very common, especially the *P. Nepalensis*, and all are ornamental. One species, the *P. fruticósa*, (E. B. ii. 88.) also a native, forms a bush three or four feet high, with small pinnate and hairy leaves, and yellow flowers, the latter clustered at the ends of the stems. This also is common among shrubs. One of the handsomest flowers of the herbaceous Rosaceæ is the *Sievérsia móntana*, a plant under a foot high, with large, lyrate, interruptedly pinnate leaves, and yellow corollas resembling those of the marsh-marigold. The achenia have hairy tails like those of the pasque-flower. Against walls is very commonly seen a slender twiggy shrub, with ovate, serrate, finely acuminate leaves, and copious double orange-coloured blossoms. This is the *Kerria Japonica*. Ornamental species of *Rubus* also occur now and then, especially the *R. spectábilis*, with blossoms of a fine red. Were the family worthless as to its flowers, the raspberry and the strawberry would suffice to make it famous, contributing no less to its importance in their delicious mouthgays, than the blossoms of their kindred do in nosegays.

LIV.—THE ELM-TREE FAMILY. *Ulmáceæ.*

Trees with alternate, broadly ovate, pointed, strongly and often doubly-serrated leaves, on very short petioles, and with a pair of stipules at the base, which fall while they are still young. They are

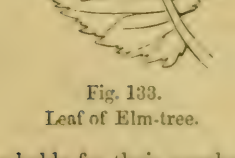


Fig. 133.
Leaf of Elm-tree.

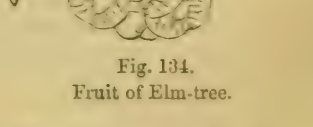


Fig. 134.
Fruit of Elm-tree.

remarkable for their roughness on the upper side, and for the unsymmetrical base, the lamina coming much further down upon one side of the petiole than upon the other (Fig. 133), and are usually deciduous. Flowers reddish-brown, in small, dense, globular, sessile bunches, appearing before the foliage, and on the preceding year's twigs.

Perianth single, irregular, pentamerous, or nearly so; stamens about five; stigmas two. Fruit flat, thin, green, resembling a little leaf, with a notch at the top, and a solitary seed in the centre, and ripening as the young leaves come forth. (Fig. 134.)

Elm-trees are natives of the North of Europe, Asia, and America; also of the mountains of China and India, and in the former countries are highly valued for their timber, as well as for their stateliness and picturesque habit of growth, though in some species this is not realized. The wood is soft, tough, and coarse. Several supposed species have been described by authors as natives of our island, some raising the number to six, but all, it would appear, are resolvable into two, both of which occur near Manchester.

1. Fruit roundish, slightly notched at the top, the seed-bearing cavity placed considerably below the notch. Perianth usually five or six-cleft; stamens five or six ..... } Wych Elm.

2. Fruit oblong, deeply notched, the notch almost reaching the seed-bearing cavity. Perianth usually four-cleft; stamens four ..... } Common Elm.

HABITATS AND LOCALITIES.

1. Wych Elm—(*Ulmus montána.*)

Hedges, and in most places where trees grow, especially near riversides. Abundant about Marple and Agecroft, and apparently quite wild. Fl. March, April.

E. B. xxvii. 1887; Baxter, v. 386.

A tree of considerable size, the large branches spreading from near the ground, unless drawn up while young. When, in early spring, the bare, dark upper twigs put forth their little umbels of flowers, insignificant as they are in the hand, the rich vinous tint they give to the tree is grateful and pleasing. Afterwards, in May and the beginning of June, the clusters of leaflike fruits form a new and conspicuous ornament, thickly covering the extremities of the young branches, and when they fall, the ground is strewed with them as plentifully as by the leaves of autumn. The foliage, before decay, turns brownish-yellow.

2. Common Elm—(*Ulmus campéstris.*)

Woods, hedges, parks, plantations, and by waysides, common, but probably in every case planted, unless about Mobberley. Fl. March, April.

E. B. xxvii. 1886.

Whether the elm be indigenous anywhere in this country is more than doubtful. Central and southern and eastern Europe, and western Asia, are its truly native

regions, and although apparently wild in England, it is probably only from long residence. A good test of a plant's being really indigenous to a given country, is its ability to multiply itself there naturally from seed, or without the assistance of man. This power does not appear to be possessed by the *Ulmus campéstris*, and hence, in connection with other circumstances, a foreign origin is reasonably supposed. It is a taller and a straighter-growing tree than the wych-elm, attaining, in favourable soils, the height of a hundred feet or more; but rarely near Manchester is it seen of such altitude. The loftiest elms in our district stand in a semicircle at Tipping's Brow, near Mobberley Church. A variety with smooth leaves is the *Ulmus glabra* of E. B. xxxii. 2248; and another with corky bark has been treated as a species under the name of *Ulmus suberósa*. (E. B. xxxi. 2161.) The latter is said to grow in "various places in the neighbourhood of Tyldesley." (B. G.) There is also a corky-barked variety of the wych-elm.

LV.—THE LYTHRUM FAMILY. *Lythráceæ.*

A family of about three hundred elegant herbaceous, undershrubby, and occasionally arborescent plants, diffused nearly all over the world. Leaves mostly (or at least the lower ones) opposite, entire, and without stipules; stems usually four-cornered; flowers axillary, or forming terminal racemes or spikes, which are more or less leafy at the lower part; calyx tubular, with as many, or twice as many teeth as there are petals, the latter inserted into its upper extremity, and usually four or five. Stamens seated upon the calyx, and usually lower down in it than the petals, the number of which they either equal or double. Fruit a small, many-seeded capsule, covered by the permanent calyx, but not united to it.

Three species grow wild in England, and all are found near Manchester. The flowers are in every case trimerous.

1. Stems two to four feet high, square, and slightly branched; leaves lanceolate, sessile, entire, two to three inches long, usually opposite, but sometimes in threes or fours; flowers reddish-purple, in dense whorls in the axils of the upper leaves, forming handsome tapering spikes, six to eighteen inches long. Petals six; stamens about twelve ..... — Purple Lythrum.

2. Stems six to eight inches high; leaves sessile, barely half an inch long, the upper ones alternate; flowers small, purple, solitary in the axils of the upper leaves; stamens six.... — Hyssop-leaved Lythrum.

3. Stems two to four inches high, numerous, and creeping; leaves tapering into short stalks; flowers as in the preceding, but in the axils of nearly all the leaves, and sessile — Peplis.

HABITATS AND LOCALITIES.

1. Purple Lythrum—(*Lythrum Salicária.*)

Pondsides, stream-sides, and marshy places, abundant everywhere; sometimes in moist cornfields. Fl. July, August.

Curtis, i. 173; E. B. xv. 1061; Baxter, iii. 220.

One of the most shewy of our native plants, the stems generally growing many together; their splendid spikes towering above the rushes and other semi-aquatics like crimson sceptres, and at a distance resembling foxgloves.

2. Hyssop-leaved Lythrum—(*Lythrum hyssopifólium.*)

Between Worsley and Boothstown, sparingly. (J. E.) Fl. August. Annual.

E. B. v. 292.

3. Peplis—(*Péplis Pórtula.*)

Watery places, especially such as are apt to become dry in summer, not infrequent. Baguley; Sale; Lindow Common; plentiful on Hale Moss; the same in ditches at Godley, and at Eccles (J. S.); Mausolee Common, Tyldesley. (J. E.) Fl. July, August. Annual.

Curtis, ii. 244; E. B. xvii. 1121; Baxter, iii. 220.

A few American *Cupheas* are in cultivation, but no others of this family that I am aware of.

LVI.—THE BUCKTHORN FAMILY. *Rhamnáceæ.*

Trees and shrubs, the branches often spinous. Leaves simple, undivided, and usually alternate. Flowers small, numerous, generally green, on very short pedicels, axillary or terminal, sometimes unisexual by defect. Calyx four to five-cleft; petals four to five, minute, and often convolute or concave, sometimes absent. Stamens of the same number, and opposite the petals; or if petals be wanting, alternate with the calyx-lobes.

Rhamnaceæ are found nearly all over the world, excepting in the Arctic regions. Warm countries possess the majority of the two hundred and fifty known species. Two grow wild in England,—the *Rhamnus cathárticus*, distinguished by its spines or thorns, and the *Rhamnus Frángula*, which is destitute of spines. The latter only is found near Manchester, where it presents itself as an erect and glabrous shrub or small tree, four to eight feet high, with broadly-

ovate, obtuse, entire or slightly-waved, feather-veined, and petiolate leaves; minute, pentamerous, and bisexual flowers, growing two or three together in the axils of the leaves, and followed by pea-like berries, pinkish-green while immature, and when ripe, of a dark-purple colour. Fruit and tardy blossoms may often be found in company on the same branch. Like the berries of many other species of this genus, those of the *Frangula* are violently purgative, and though exceedingly inviting to the eye, should therefore be left untasted.

HABITATS AND LOCALITIES.

ALDER BUCKTHORN—(*Rhámnus Frángula.*)

Moist woods and in low wet ground, as by pondsides and on the borders of marshes, frequent. Plentiful in and about Mere Clough and Prestwich Dells; by the sides of ponds below Bowdon old Church, and about Mobberley; near Rostherne Mere, and on the drained edges of many of the mosses. Fl. May—July.

E. B. iv. 250; Baxter, iii. 219.

Several Rhamnaceæ occur in green-houses and shrubberies, but the only common one is the *Alatérnus*, an ornamental evergreen, with serrated leaves, and small, pale, honey-scented flowers, produced abundantly in March and April.

LVII.—THE SPINDLE-TREE FAMILY. *Celastráceæ.*

Small trees or shrubs, with simple, undivided, alternate, or sometimes opposite leaves; the flowers in loose axillary cymes, small, and usually purplish-green. Sepals four or five, inserted into the margin of an expanded disk; petals four or five, inserted by a broad base, under the margin of the disk, but sometimes absent. Stamens the same number, and alternate with the petals. Ovary immersed in the disk, with a very short style.

A family with numerous representatives in the warmer parts of the world, a great number inhabiting the Cape of Good Hope, but in England known only in the *Celastrus* and the spindle-trees, the latter of which alone are objects of Manchester botany. The common spindle-tree is a glabrous, green-barked shrub, three to eight feet high, with ovate-lanceolate, pointed, and minutely serrated leaves; and cymes of three to five yellowish-green and tetramerous flowers, borne on peduncles shorter than the leaves. The capsule is strikingly

beautiful, having about four prominent angles, and as many cells, and opening, when ripe, into as many valves, so as to disclose the scarlet seeds, which are enveloped in a peculiar covering of a brilliant orange colour. This covering is called the *arillus*, and is of exceedingly rare occurrence. The finest example of it is in the nutmeg-tree, where it spreads over the shell that encloses the kernel or "nutmeg" of the shops, and when dry, is the aromatic substance known as "mace."

HABITATS AND LOCALITIES.

COMMON SPINDLE-TREE—(*Euónymus Europæus.*)

Cotterill Clough, abundant formerly, but many of the trees are now cut down. Fl. May. Fruit ripe in September.

E. B. vi. 362; Baxter, ii. 123.

Not uncommon in plantations, as at Rusholme, Didsbury, Blakeley, and Northen. The berries, and even the leaves, are said to be dangerous; while the tough white wood, like that of the wild cornel and the Guelder-rose, is excellent for such things as skewers. The broad-leaved spindle-tree, or *E. latifólius*, from the Continent of Europe, occurs in similar situations.

LVIII.—THE HOLLY FAMILY. *Aquifoliáceæ* or *Ilicíneæ.*

Evergreen trees and shrubs, the branches often angular; the leaves simple and leathery; flowers small, regular, white or greenish, axillary, solitary or clustered, and in some respects like those of the *Celastraceæ*, from which family the present is positively distinguished by the fleshy and indehiscent fruit. The species are natives principally of North and South America, the West Indies, and the Cape of Good Hope, and include a good many plants useful to man, the most celebrated being the shrub which yields *maté* or Paraguay tea, extensively used as a beverage in Brazil and the adjoining governments. A few kinds of *Cassine*, from the Cape, and of *Prinos*, from North America, are inmates of English gardens, but the common European holly is the only species likely to attract attention, either by its frequency or its figure. The glossy, evergreen, and usually prickly leaves of this truly handsome tree, uninjured by the severest winters, along with its smooth gray bark and axillary clusters of nearly sessile, tetramerous white flowers, succeeded by scarlet or yellow berries, give it a striking

and admirable distinctiveness, whether in the wilderness, the hedge-rows, the garden, or the glad, bright, songful atmosphere of Christmas under the roof of home. Perhaps no tree is so universally beloved for its beautiful and heart-stirring associations. The edges of the leaves, waved with prickly teeth, present the most elegant curves in nature. The upper leaves are sometimes quite entire.

Holly grows wild all over Great Britain, except in the North-east of Scotland, and belongs accordingly to the indigenous Flora of Manchester.

HABITATS AND LOCALITIES.

Common Holly—(*Ilex Aquifolium.*)

In hedges and woods, especially on a light or gravelly soil, often, without doubt, from the hand of man, but truly wild at Greenfield and in other mountainous districts. Between Disley and Strines there is a natural wood of it. (Mr. J. Sidebotham.) Fl. May.

E. B. vii. 496; Baxter, iv. 262.

The variegated hollies which so greatly ornament our gardens and plantations; the extraordinary "porcupine holly," which has prickles upon the surface of the leaves, as well as round the edge; and the smooth or thornless kinds, are all varieties, induced by cultivation, of the common *Ilex Aquifolium*. Mr. Yates has a remarkable collection of them.

LIX.—THE PERIWINKLE FAMILY. *Apocynaceæ.*

A large and splendid family of the tropics, especially the hotter parts of Asia, which they greatly assist to ornament, but, like the Ranunculaceæ of the North, they are in many cases venomous, and very generally to be suspected, though now and then yielding eatable fruit. A few scattered representatives only are thrown out into temperate and cold countries, such as the dog's-bane or *Apocynum* of North America, and some of the pretty undershrubby and often trailing plants comprised in the genus *Vinca*. A great diversity of character pertains to them; in one curious point they seem, however, to correspond universally, namely, in the structure of the stigmas, which are collected into a massive head, expanded at the base into a ring-like membrane, and in the middle contracted, so as to resemble a

little hour-glass. The leaves are generally opposite, and always quite entire; the flowers regular, and formed of five united petals, which are twisted while in the bud, with five stamens, inserted in the tube.

Two species are accounted wild in England, the greater periwinkle and the less, the latter being found near Manchester.

The first, or "greater periwinkle" (*Vinca major*, Curtis, ii. 236), has long, trailing, flowerless stems, with broadly ovate, evergreen, shining leaves; and simple and nearly erect flowering stems, rising to the height of twelve or eighteen inches. This species is exceedingly common in gardens, especially upon rockeries, which it prettily ornaments in spring with its glossy leaves and large flat blue flowers. The sepals are *ciliated*.

The "small periwinkle" differs from the greater in its more trailing habit of growth, inferior size, narrower, ovate, or oblong leaves; smaller flowers, and shorter and broader sepals, *not ciliated*. This one also is common in gardens, where it varies with white flowers, with double flowers, and with variegated leaves. The blossoms of both species furnish exquisite objects for microscopical examination, not only in the singular stigmas, but in the stamens, which are shaped like a note of interrogation (?). The petals are oblique, and the mouth of the tube is angular and closed with hairs.

HABITATS AND LOCALITIES.

Small Periwinkle—(*Vinca minor.*)

Hedgebanks and shady places, rather uncommon. Right bank of the Irwell, below Clifton Aqueduct, plentiful. Hedges between Hoo Green and Bucklow Hill, plentiful. (Mrs. Brownell.) Fields about Haydock, plentiful. (Miss Alice Evans.) Little Hulton. (R. H.) Astley Green, and Mausolee Common, near Tyldesley. (J. E.) Wood near Marple Bridge, plentiful. Formerly on Kersal Moor. Fl, Spring and summer.

Curtis, i. 161; E. B. xiii. 917.

In hot-houses the *Allamánda cathártica*, with large yellow bell-shaped flowers, is now frequent, together with the lovely *Vinca rosea*, a little upright periwinkle, the petals of its flat and circular flowers of the purest white, excepting the eye or centre, which is pink. The *Nerium* or Oleander, of the South of Europe, a formidable poison, the *Apocynum androsæmifólium* and a few species of *Echites* and *Strophanthus* nearly complete the list of those in common cultivation.

LX.—THE TOOTHWORT FAMILY. *Orobanchàceæ.*

In the *Orobanchàceæ* we have another family of *parasites*, in general habit and mode of growth resembling the *Monótropa* (p. 163), but in their flowers and fruit approaching more nearly to the foxglove and its allies. Like the *Monótropa*, they are leafless and cadaverous; their stems, which rise to the height of six or eight inches or more, being of a white or brownish hue, passing into purple or yellowish, and clothed with scaly bracts instead of leaves. The flowers in all the native species are of the same peculiar dingy hue as the stems, and borne in terminal spikes; the corolla is tetramerous, irregular, and tubular; the stamens are four, and didynamous; the ovary is solitary, two-celled, and many-seeded. The principal seats of growth selected by these singular plants are the roots of trees and shrubs, such as ivy, hazle, furze, broom, and black poplar; but a few prefer herbaceous plants, as clover, the wild carrot, hemp, knapweed, and yarrow; some appearing to thrive only on a single kind of plant, or at most only upon two or three closely allied ones, while others will grow upon a variety of plants, and such as possess no immediate affinity. How far the configuration and colour of the parasite are affected by the peculiar sap of the plant on which it feeds, is not yet ascertained. There is reason to believe that the influence of the stolen nourishment is considerable, and that the number of species appears in consequence very much larger than it actually is. Almost all parts of the northern hemisphere are acquainted with them, and a few are found at the Cape of Good Hope.

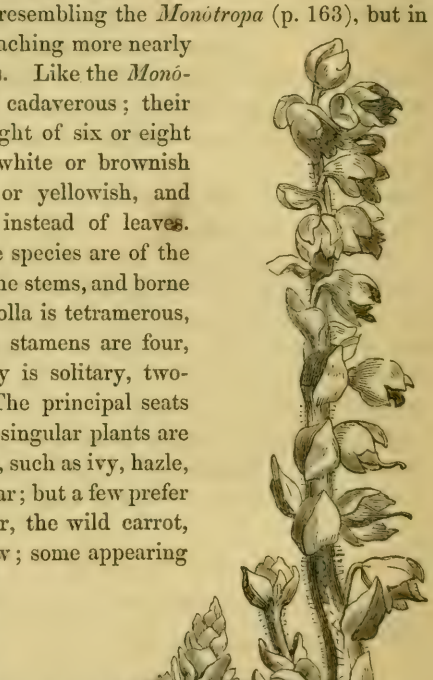


Fig. 135.
Toothwort.

Eight grow wild in England, two occurring near Manchester.

1. A cadaverous, or pale rose-coloured and succulent plant, three to six inches high, with a crowded spike of flesh-coloured or slightly blueish flowers, streaked with purple, somewhat drooping, and all turned one way. Underground part of the stem branched, and clothed with short, thick, fleshy, white scales, resembling the front teeth. Calyx tubular and inflated, the lobes broad and short. (Fig. 135)..... } Toothwort.

2. A dusky, club-like plant, with a purplish-brown and viscid stem, twelve or eighteen inches high, very much swollen at the base, and clothed with tapering scales. Flowers pinkish-brown, crowded into a long dense spike. Calyx divided to the base into two or four long and pointed lobes ..... } Great Broom-rape.

HABITATS AND LOCALITIES.

1. Toothwort—(*Lathræa squamária.*)

Woods and shady places, living recluse from public view, and seated usually on the roots of hazles and black poplars, preferring such as are not far from streams of water. By the Mersey, opposite Northen Boat-house; plentiful at Red-brows, a mile further down the river; again opposite Trafford Hall; and at Barton, in Foxhill meadows. (J. S.) Found also at the north side of Windybottom Bridge, near Mellor, Derbyshire (Mr. Isaac Williamson); in Cotterill Clough; at Marple; and in Gatley Carrs. (Mr. Edward Stone.) Fl. April, May.

E. B. i. 50; Baxter, v. 365.

2. Great Broom-rape—(*Orobánche májor.*)

Several localities are mentioned in Buxton's Guide, but they appear to be obsolete. Near Congleton it grows abundantly on the roots of broom; and as the shrub in question flourishes thereabouts in great plenty, the parasite is likely to hold its station permanently. It should be sought both upon broom and on the roots of furze, having a great love for the shrubby Leguminosæ. Fl. June, July.

Curtis, ii. 264; E. B. vi. 421.

LXI.—THE GENTIAN FAMILY. *Gentianáceæ.*

A rather extensive, very well marked, and elegant family, consisting almost entirely of herbaceous plants, which, with the exception of a few exotic species, are perfectly glabrous, with entire, usually opposite and undivided leaves, destitute of stipules, and generally sessile; the flowers usually in terminal and dichotomous cymes or panicles, with a solitary blossom in every fork. Calyx and corolla regular, usually pentamerous, but in a few cases with the parts in fours; the stamens corresponding, alternate with the divisions of the corolla, and all in

one line. Ovary single, one or partially two-celled. Fruit capsular, opening in two valves, and many-seeded. The limb of the corolla is in several cases furnished with a delicate but conspicuous fringe or hairy tuft, and the stems are often remarkably erect.

The Gentianaceæ are diffused almost all over the world, ascending to the regions of perpetual snow upon the summits of the mountains of Europe, and tenanting the hottest sands of India and South America.

Fig. 136.
Field Gentian.

Fig. 137.
Chlora.

They are equally remarkable for the diversity and vivid beauty of their colours, and for the uniformity of their properties. Pure and intense bitterness in every part—root, leaves, and flowers—is their eminent characteristic, rendering them highly valuable in medicine.

Sixteen species grow wild in England, six of them occurring near Manchester.

A.—Leaves deeply three-cleft, on long petioles; stem six to twelve inches high; flowers pentamerous, in upright racemes; petals white, tinged externally with red, and elegantly fringed on the inner surface with white filaments ..... 1. Bog-bean.

B.—Leaves undivided, opposite, and sessile.

- Flowers rose-coloured, pentamerous, in thin, forked, and flat-topped bunches; stem nine to eighteen inches high; leaves broadly-lanceolate, with strong parallel ribs; anthers twisted spirally after shedding their pollen ..... 2. Blushwort.
- Flowers bright yellow; sepals, petals, and stamens eight each; stem six to twenty inches high, panicled; leaves triangular and connate; whole plant glaucous. (Fig. 137) .. 3. Chlora.
- Flowers blue or purplish; corolla tubular, an inch or more in length.
  - Petals fringed, purplish.
    - Flowers tetramerous, crowded; two of the calyx-lobes broadly-ovate; stem two to six inches high; leaves ovate-lanceolate (Fig. 136) ..... 4. Field Gentian.
    - Flowers pentamerous; calyx lobes all narrow-lanceolate. (In other respects much resembling the above)..... 5. Autumnal Gentian.
  - Petals without fringes; flowers one to three, large, deep-blue, pentamerous, with five longitudinal green plaits; stem simple, four to ten inches high; leaves linear. ..... 6. Purple Moor Gentian.

THE GENTIAN FAMILY.

HABITATS AND LOCALITIES.

1. Bog-bean—(*Menyánthes trifoliáta.*)

Boggy ground, swamps, and by pondsides, where the water and the grass maintain perpetual and doubtful strife. Chorlton; Withington; Bowdon; Rostherne; Mobberley. Plentiful on Hale Moss, and in ponds by the road between Manchester and Hyde, flowering freely, and generally so, where not too luxuriant. Plentiful in Middle Hulton, Bedford, Shakerley, and on Chat Moss, with profusion of bloom every season. (R. H.; J. E.) Fl. June, July.

Curtis, ii. 234; E. B. vi. 495; Baxter, iv. 245.

The *Menyanthes* is one of the most beautiful plants this country can boast, and justly deserves its title of the hyacinth of the marshes. The delicate rose-hue of the flowers, and the curious shaggy beards upon their petals, at once distinguish it from every other. Like all our other large aquatics and vegetable amphibia, it does not seem so much an English plant as one of tropical countries. Our land-plants without exception have a *domestic* look about them, but the water-lovers shine with a foreign-looking glory that makes them seem emigrants from the lands of humming-birds and palm-trees. The root is intensely bitter, and reputed one of the most valuable of known tonics.

2. Blushwort—(*Erythræa Centaurium.*)

Dry pastures, especially on hill-sides, but rather uncommon, and the quantity diminished every year, being ravenously plucked up by the herb-gatherers while in bloom, whereby seeding and progeny are prevented. In the neighbourhood of Lymm, especially in the herby pastures above the upper end of the water; in fields about Rostherne Mere, Bramhall, and Mobberley, pretty plentiful; and abundant on the hill-sides above Strines. Fl. July—September. Annual.

Curtis, ii. 239; E. B. vi. 417 (both as *Chironia Centaurium*); Baxter, v. 367.

In great repute as a bitter, and sold in the market under the name of "Sanctuary," which word appears to be a corruption of "Centaury," the name, properly, of a genus of the Composite Family. The rosy, jessamine-like, and lemon-scented flowers expand only in sunshine, and are seldom seen open after noon. The lovely hue of the petals, the spirally-twisted yellow stamens, and the elegantly wayward corymb, render this plant one of the prettiest in English botany.

3. Chlora—(*Chlóra perfoliáta.*)

Dry fields and waysides, rare. On a steep bank near Castle Mill, Cotterill, fine and abundant. In an old cow-lane at the lower end of Cotterill. Alderley, in a pasture under the Edge, and about Mobberley. (Mr. Holland.) In fields near Rostherne Mere, with the

Erythræa Centaurium. Near Light Oaks, Bedford, and at Astley, but sparingly. (R. H.) Fl. July, August. Annual.

Curtis, iii. 485; E. B. i. 60; Baxter, i. 69.

Like the blushwort, of the company of which it is fond, this beautiful plant expands its corollas only in sunshine, and is equally distinguished among our wild-flowers by the clear purity of its colour. After the teasel it is the best example among British plants of the connate leaf.

4. Field Gentian—(*Gentiana campéstris.*)

Amid the virgin turf of uncultivated hills. Werneth Lowe, near Hyde, plentiful. Fo-edge, beyond Bury; and in the mountainous districts beyond Stalybridge, common. Fl. August, September. Annual.

E. B. iv. 237.

5. Autumnal Gentian—(*Gentiana Amarélla.*)

In similar situations. Saddleworth and Fo-edge, plentiful. Abundant on a bit of waste ground near the drawbridge over the canal between Disley and Strines. (Mr. J. Sidebotham.) Fl. August, September. Annual.

Curtis, iii. 467; E. B. iv. 236.

6. Purple Moor Gentian—(*Gentiana Pneumonánthe.*)

On moors, rare. Amberswood Common, between Hindley and Wigan. (R. H.) Highfield Moss, near Parkside, but the quantity much reduced of late years. (J. E.) Dean Moss, near Newton-in-the-Willows, by the race-ground, plentiful, and perhaps now the best locality. Wilmslow Common. (Rev. W. Brownlow.) "Heath near Holmes Chapel." (Baxter.) Fl. August, September.

E. B. i. 20; Baxter, iii. 185.

This beautiful plant formerly grew in abundance on Baguley Moor, a place once famous among botanists, but now converted by the plough into productive farm-land, and serving greater and wider uses. Solitary specimens may probably still be found on ditch-banks and drain-sides. Formerly it was abundant also on Woods Moor, Bramhall, but there, too, it has been erased by cultivation. To some it is cause of regret that rich botanizing grounds like Baguley Moor should be taken away; but nothing can be lamentable which is productive of benefit to a whole community. The right onward furrow of a generous utility is more to be admired than the bloom of a thousand gentians.

An exceedingly elegant aquatic of this family, the *Villarsia nymphæoides*, (Curtis, iv. 591.) a miniature water-lily in its round floating leaves, and yellow

flowers, is naturalized in England, and inserted in all general Floras. Growing readily when planted in ponds, it has several times become half-wild near Manchester, but now seems to be nearly gone again. The old locality in Greenheys has been destroyed for several years; and though plentiful some little time ago in the reservoir of the Rhodes Print-works, near Middleton, having become too much of a weed, *i.e.*, "a flower out of place," it has there also been dragged out, and well-nigh exterminated. It is really melancholy to think that many of our loveliest wild-flowers should in some way or other be pernicious and hated weeds.

The garden representatives comprise the brilliant gentianella or *Gentiana acaulis*, (E. B. xxiii. 1594.) its incomparable deep-blue vases, streaked in the inside with green, and lifted scarcely above the level of the ground, contrasting superbly with the crimson anemones and white narcissus of April and May; and several large but less shewy species that bloom in summer and autumn, viz., the yellow *Gentiana lutea*, and the blue or purple *cruciata*, *septemfida*, and *asclepiadea*. The *G. verna* is also found in curious collections. Green-houses present different species of *Chirónia* and *Erythræa*, with flowers of the loveliest and purest pink, their large yellow anthers twisted into spiral scrolls after the discharge of the pollen. The *Villarsia* is grown in the ornamental water at the Botanic Gardens.

LXII.—THE LILAC FAMILY. *Oleáceæ.*

Trees and shrubs, the branches usually dichotomous, and ending abruptly in a large and conspicuous bud. Leaves opposite, either simple, undivided, and more or less oval, lanceolate, and pointed; or pinnate, with many pairs of leaflets. Inflorescence in terminal or axillary racemes or panicles, the branches and pedicels opposite. Flowers tetramerous, small, but from their abundance gay, and often highly scented. Stamens two, usually concealed in the corolla, the lower part of which is tubular, and on the inner surface of which they grow. Ovary single; fruit various, usually either a berry or a capsule. In the ash-tree the perianth is undeveloped, a circumstance which at the first glance makes it seem quite out of place in a family which in every other instance is possessed of one. Under an artificial system of classification, so wide a difference would remove it elsewhere, and thus to a distance from its real congeners; but in the Natural System all *single* characters are subordinate to the *mass of characters*, and here we see the great excellence and superiority of this system. The ash-tree agrees with the lilac, the olive, the privet, and every other member of the family, in all particulars but perianth, and

the absence of this part reckons as a mere exception to the general rule, that the family they compose has the customary floral coverings. Similar anomalies occur in the leafless furze among the *Leguminosæ*, and in the genera that have no petals among the *Ranunculaceæ*.

The Oleaceæ are natives chiefly of temperate latitudes, inclining towards the tropics, and number between one and two hundred species. Many useful plants are contained in the family; the ash-tree supplies

Fig. 138.
Leaf and Fruit of Ash-tree.

timber, the *Olea Europæa* olives and olive oil, and different kinds of *Ornus* and *Fraxinus* the sweet medicinal substance called "manna."

Two species grow wild in England, and both of them near Manchester.

1. A tall and extremely graceful tree ("*Fraxinus in pulcherrima sylvis*"), with smooth gray bark, large sooty-black buds, and handsome pinnate leaves, eight to twelve inches long, and composed of five or six pairs of lanceolate, serrated leaflets. Flowers in loose panicles, appearing before the foliage, and consisting simply of two stamens and a pistil, the anthers large, oval, and of a fine reddish-purple. Fruit a thin, flat, oblong, light-brown carpel, with a single seed lying at one end, and resembling half of the fruit of the sycamore (p. 158). Individual trees are often unisexual ..... } Common Ash-tree.

2. A shrub, three to six feet high, with dark-green, lanceolate, entire, and pointed leaves, which often remain over the winter. Flowers white, in pyramidal clusters, and sweet-scented. Fruit a globular and shining black berry ..... } Common Privet.

HABITATS AND LOCALITIES.

1. Common Ash-tree—(*Fráxinus excélsior.*)

In woods, plantations, and hedgerows, everywhere. Fl. March, April.

E. B. xxiv. 1692; Baxter, v. 382.

The ash-tree, when without leaves, is immediately known by its black buds, the twigs supporting which are flattened and channelled at the extremity. In old trees, the lower branches, after drooping, curve upwards at the end. Every young part is exceedingly brittle, snapping like a radish, and presenting, in this respect, a remarkable contrast to the willow, which is as tough as a piece of wire. Few trees are bare of leaf for so long a part of their time, the ash being one of the late risers, seldom green all over until June, and losing its foliage with the first frost, which often brings down the whole at one fall. Hence we rarely behold in this beautiful tree those gorgeous tints which make most others so charming towards October. The only change the leaves appear to undergo is to curl up as if scorched. The clusters of dry brown fruits, or "ash-keys," remain on the topmost branches until spring, and are highly characteristic. That picturesque production of nature, the weeping ash, so charming an ornament for the lawn, is a variety. In the grounds at Withenshaw Hall, the seat of T. W. Tatton, Esq., there is a noble specimen, so perfect and symmetrical as to form a vegetable tent.

2. Common Privet—(*Ligústrum vulgáre.*)

Hedges. Plentiful between Sale and Carrington Moss, but doubtfully wild. Cotterill Clough, abundant.

Curtis, ii. 293; E. B. xi. 764; Baxter, ii. 119.

The demure white flowers appear plentifully in June, and in favourable situations are followed by beautiful *thyrsi* of black berries. The latter remain upon the bushes till mid-winter, contrasting finely, in their high polish and deep colour, with the scarlet fruits of the bryony and the wild-rose. No shrub is commoner in the fences of town-gardens.

Every one knows the delicious lilac, or *Syringa vulgaris*, and in it the most perfect example of this family. The name is a Persian one, and in its native country signifies "flower," so that when we say, a "white lilac," it is tantamount to "white *flower*." The small narrow-leaved species, called emphatically the Persian, or *Syringa Persica*, bears forcing very well, and hence is a frequent ornament of the conservatory soon after winter. The *Ornus*, or manna-tree, is occasionally seen in shrubberies, together with an evergreen shrub called *Phillyréa*.

LXIII.—THE POTATOE FAMILY. *Solanáceæ.*

One of the large and important families of botanical nature, commending itself to our attention alike by the beauty of its flowers and fruits, and by the powerful and often deadly quality of its secretions. Leaves alternate, destitute of stipules, but sometimes accompanied by a smaller leaf at the base, and either simple and undivided, or lobed, or irregularly pinnatifid or pinnate. Flowers regular, or slightly unequal, usually pentamerous, often bell-shaped, or starlike. Stamens inserted upon the corolla, and corresponding in number with its lobes, with which they are alternate. Ovary single, two-celled, or incompletely four-celled. Style one; stigma simple. Fruit a berry, or sometimes a capsule; in either case with many seeds. The calyx often remains until the fruit is ripe; and the peduncles often spring from the internodes instead of the axils. Most of the species are herbaceous, or undershrubby, but a few become soft-wooded trees.

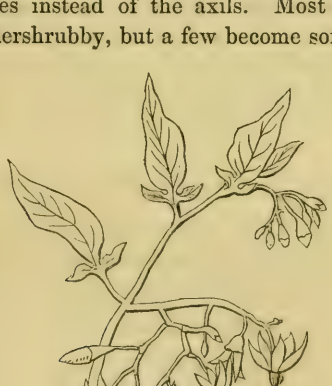


Fig. 139.
Bitter-sweet Nightshade.

Linnæus called this family "Luridæ," from their suspicious smell and appearance, which he regarded as indicative of the narcotics and terrible poisons so abundantly diffused among their species. Stramonium, henbane or *Hyoscyamus*, tobacco, belladonna, nightshade, meet here in deadly compact, with a long train of plants which, if not absolutely noxious, are most potent in their action upon the human frame. Hence the value of the family in medicine, which derives

from the Solanaceæ some of its most energetic drugs. With the poisons are mingled, however, productions fit for food. The potatoe, though the extract from its leaves is a strong narcotic, ranking between belladonna and conium, is inestimable in its farinaceous tubers; while the tomato, or love-apple—the fruit of the *Lycopérsicum*—that of the egg-plant, or *Solanum melongena*, and of several others of the genus, are not only harmless, but agreeable. Pungency is at its maximum in Cayenne pepper, prepared from the fruits of the capsicum, which are also the principal element of "hot pickles." The family is distributed all over the world, excepting the extremely cold parts, but is chiefly seated in the tropics.

Five species are accounted wild in England, three of the number occurring near Manchester.

A.

1. Flower trumpet-shaped, three inches long, tubular, white, flushed with yellow; stamens standing apart from one another; leaves ovate, angular; fruit a prickly capsule, the size of a walnut, opening into four pieces; stem branched, two to three feet high..... } THORN-APPLE.

B.

Flower in five starlike points; stamens forming a cone or pyramid. Inflorescence in lateral corymbs.

2. A scrambling, undershrubby plant, the stems often five or six feet long; the leaves heart-shaped and pointed, many of them hastate; flowers purple, with two green spots at the base of each segment; anthers large and yellow; berries oval, crimson, and semi-transparent when ripe, and hanging in elegant clusters, which often remain after the leaves are withered. (Fig. 139) ..... } BITTER-SWEET NIGHTSHADE.

3. Stem herbaceous, twelve or fifteen inches high; leaves ovate; flowers white; berries black, or occasionally green ..... } BLACK-BERRIED NIGHTSHADE.

HABITATS AND LOCALITIES.

1. THORN-APPLE—(*Datûra Stramónium.*)

A native of the East Indies, now extensively naturalized in Europe, owing, it is believed, to the Gipsies, who used the seeds medicinally, and carried it wherever they wandered. By reason of its beauty, both as to flowers and large prickly capsules, it is also a frequent inmate of the garden. From one source or another, it is frequently found in waste places, among vegetable rubbish, in potatoe fields, on heaps of manure by the wayside, &c., but seldom in the same spot for more

than one season. Chorlton; Heaton Norris; Bowdon; Eccles. Fl. July. Annual.

Curtis, ii. 381; E. B. xviii. 1288; Baxter. ii. 121.

2. Bitter-sweet Nightshade—(*Solánum Dulc-amára.*)

In damp hedges, and among the tangled masses of summer vegetation on the borders of ponds and ditches, common everywhere. Fl. June, July.

Curtis, i. 14; E. B. viii. 565; Baxter, ii. 110.

Few plants that grow in our hedges adorn them more beautifully than the bitter-sweet nightshade, whether regarded as to its purple and starlike flowers, or the delicate translucent crimson of its ripened berries, which hang in clusters till shrivelled by the frost, and long after the leaves are gone. Unhappily, it is deleterious. The leaves are strongly narcotic, and the berries, though it does not appear that they are inevitably poisonous, certainly most dangerous to the eater. It is very commonly thought to be the *deadly*-nightshade, or *Atropa Belladónna*, (Curtis, ii. 308.) but the *Atropa* has solitary and bell-shaped flowers instead of clustered and starlike ones, and the fruit, instead of being red, resembles a small black cherry. This terrible plant nowhere exists wild in our neighbourhood, that I am aware of, or nearer than at Furness Abbey, where a little still remains.

3. Black-fruited Nightshade—(*Solánum nigrum.*)

Waste and cultivated ground, rather rare. Hale Moss, plentiful. As a garden weed, about Bowdon, Baguley, Eccles (J. S.), Leigh (J. E.), and Prestwich, at which latter place has been found a variety with *green* berries. (J. P.) Fl. June—August. Annual.

Curtis, i. 86; E. B. viii. 566.

The narcotic qualities of this species are considerably more active than those of the *Dulc-amara*, but the berries are fortunately so little tempting in appearance, that they are not likely to be tasted even by children.

The henbane, or *Hyoscyamus niger*, (E. B. ix. 591.) formerly grew in small quantity in Bowdon churchyard, but has long since been extirpated, and now there is no nearer locality, that I am aware of, than Halton Castle, near Runcorn. It is abundant in North Wales, and at Peel Castle, in the Isle of Man. Like the *Atropa*, it is occasionally cultivated by the curious.

Many rich flowers of the Solanaceæ embellish our gardens and green-houses, especially those of the beautiful genus *Petunia*, which are universal. The others are called *Nierembérgia, Céstrum, Datúra, Solánum, Nicándra, Physalis*, &c. Tobacco is grown now and then, and makes a handsome border plant for the autumn. It is also raised in pots as a curiosity for the parlour. The capsicum and the love-apple or tomato, are pretty frequent, and the potatoe of course is

everywhere. A shrub called *Lycium bárbarum*, of which there is a specimen against a cottage facing the road, on the left hand a little above Rostherne Church, may be added to the list; and likewise the curious egg-plant, or *Solanum melongena*, the large, white, oval, and pendulous fruit of which exactly resembles the egg of the domestic fowl. This one requires the green-house.

LXIV.—THE SAXIFRAGE FAMILY. *Saxifragáceæ.*

Pretty herbaceous plants, often moss-like in aspect, and growing in dense patches; the flower-stems usually glandular, and seldom more than twelve inches high. Leaves simple, ovate or roundish, usually serrate or crenate, sometimes irregularly pinnatifid, destitute of stipules, and in almost every case alternate. Calyx more or less adherent to the ovary, usually five-lobed; petals and stamens each five or ten, and both seated on the calyx. Ovary usually of two carpels, which cohere below, but diverge at the upper part; stigmas sessile. Fruit a capsule; seeds numerous and minute. The corolla is regular in almost every species, white, pink, red, or yellow, but never blue, and often speckled. In the genus *Chrysosplenium* the petals are absent, and the calyx is usually four-cleft, with eight stamens.

Fig. 140.
Flower of Parnassia.

The Saxifragaceæ belong entirely to the temperate parts of the northern hemisphere, abounding upon mountains, and "frequently forming the chief beauty of that rich turf which is found near the snow in high alpine stations." A few grow in moist meadows and woods, and even upon walls. They are noted for their astringency, and a few are bitter and tonic.

Between three and four hundred species are known, sixteen growing wild in Britain, and five of them near Manchester.

- **A.—Flowers white, with both calyx and corolla.**
  - Root-leaves tufted, heart-shaped, on long stalks, entire, and glabrous. Stem three to twelve inches high, usually bearing a single roundish and sessile leaf, and a solitary and terminal flower, consisting of five large, white, beautifully-veined petals; five perfect stamens, and five imperfect, the latter consisting of fan-like scales, fringed with white hairs, that terminate in golden-yellow knobs. (Fig. 140.) — 1. Grass of Parnassus.
  - Stem with many leaves; flowers numerous; stamens ten.
    - Flowers three to six together, large, and in terminal cymes. Stems six to twelve inches high, slender and leafy; the lower leaves kidney-shaped and crenate. Roots with numerous, downy, and bulb-like tubers. (Fig. 141.) ..... — 2. White Meadow Saxifrage.
    - A little erect and much-branched annual, three to five inches high. Upper leaves three-lobed; flowers numerous and minute .... — 3. Rue-leaved Wall Saxifrage.
- **B.—Flowers yellowish-green, consisting of calyx only, and sometimes tetramerous, with eight stamens.**
  - Stems four to five inches high, with abundance of bright-green, tender, and succulent foliage. Leaves roundish, crenate, *opposite*. Flowers minute, in terminal flat clusters, one to three inches across..... — 4. Common Golden-saxifrage.
  - Resembling the former, but larger, and paler green; the leaves larger, on longer stalks, and *alternate;* and the flowers a more decided yellow..... — 5. Alternate-leaved Golden-saxifrage.

THE SAXIFRAGE FAMILY.

HABITATS AND LOCALITIES.

1 Grass of Parnassus—(*Parnássia palústris.*)

Hale Moss, at the further end, abundant. Wet moory ground, near Kinder Scout, plentiful. Cobden Edge, above Strines. Abundant in a field between two roads at Spons, the high hill near the further entrance to Lyme Park, visible from Hazle Grove, and looking over Kettlesham. (Mr. Isaac Williamson.) Fl. August, September.

Curtis, iii. 470; E. B. ii. 82; Baxter, i. 70.

One of the loveliest of our English wild-flowers, yet not more remarkable for the beauty of its pearly cups, and exquisite little golden-beaded nectaries, than for the curious economy which promotes the fertilizing of the ovules. The stamens, like those of the *Kalmia* and the berbery, have the power of self-movement. While the flower is but recently expanded, they lie back from the pistil and against the petals; as soon, however, as they are ready to discharge their pollen, they rise up slowly, and incline gracefully over to the stigma, across which they place themselves, give it a kiss, and then resume their first position. They do not all advance at once, but the three first of them one at a time, the second coming forwards as the first retires, and the third as the second draws away; and when the third begins to recede, the fourth and fifth come up together. The grass of Parnassus is one of the very few white flowers which retain their purity when dried for the herbarium.

2. White Meadow Saxifrage—(*Saxífraga granuláta.*)

By brook-sides in low meadows, in shady woods, and among the little trees on secluded river-banks, tolerably common. Agecroft. Woods on the banks of the Bollin, between Ashley and Cotterill. Banks of the Goyt, sparingly. In a field at Hazle Grove, near Norbury Church. (Mr. Isaac Williamson.) Plentiful about Mobberley, Ringway, and Jackson's Boat; and very abundant at Monton, in the meadows just over the bridge, growing as thick as May-flowers, and blooming at the same time.

Curtis, i. 30; E. B. vii. 500.

Very common in gardens, with the flowers double, and then immediately recognized by the clusters of small bulb-like tubers, covered with brown or whitish hairy scales, which constitute the perennial basis of the plant.

3. Rue-leaved Wall Saxifrage—(*Saxífraga tridactylites.*)

On the yard-wall at Hough-End Hall, but very small and poorly developed, and of late years much diminished in quantity. Fl. April, May. Annual.

Curtis, i. 101; E. B. vii. 501.

Fig. 141.
White Meadow Saxifrage.

4. Common Golden-saxifrage—(*Chrysosplénium oppositifólium.*)

Moist ditch-banks, and by springs and runnels of water under trees and in woods, common everywhere. Fl. April, May.

Curtis, i. 100; E. B. vii. 490; Baxter, ii. 140.

One of the early spring-flowers, prettily leading on the opening year, unpretending and delicate, and about as tall as its name would be, if written large and set up on end.

5. Alternate-leaved Golden-saxifrage—(*Chrysosplénium alternifolium.*)

Moist woods, and on the edges of little streams shaded by trees, frequent, though not so common as the preceding. Mere Clough, by the brook, on the left hand after passing the cottage in the middle. Wood by Ashley Mill. Woods in Clayton Vale and below Bowdon old Church. Banks of the Mersey, opposite Northen. Dells at Mobberley. Fl. April, May; in warm, sheltered situations, as early as March.

E. B. i. 54.

The beautiful orange-yellow *Saxifraga Hirculus* (Curtis, ii. 390.) formerly grew in abundance on Knutsford Moor, but now appears to be extirpated.

Many plants of this family open their flowers in our gardens. The largest and most striking is the *Saxifraga crassifólia*. The dense panicles of lilac flowers appear in March and April, scarcely raised above the level of the leaves, which are oval, shining, four or five inches in length and breadth, and for saxifrages enormous. Afterwards comes that universal favourite, the London-pride, or *Saxifraga umbrósa*, rendered inestimable to town-gardeners by its indifference to smoke and dirt; and along with it the pretty *Saxifraga hypnoides*, (E. B. xxxii. 2276.) another well-known plant, growing in large, circular, moss-like cushions, ample enough for a seat, and covered with little bunches of cream-white blossoms. In June comes the tongue-leaved saxifrage, or *S. linguláta*, a noble species, easily recognized by its great pyramid of white flowers, the petals speckled with crimson, and by its hard, gray, rough-edged, tongue-like leaves, which grow in a rosette like that of the London-pride. Besides these larger kinds, the curious have upon rockeries and in pots a host of little alpine species, the prettiest being the *S. oppositifólia*, (Curtis, ii. 391.) which expands its crimson flowers early in March, the "rosy-fingered morning" of the garden. For a parlour there is no prettier vegetable ornament than the *Saxifraga sarmentósa*. Suspended in a basket, it sends out long, pendulous, strawberry-like stems, twenty or thirty inches long, and as fine as thread, each with a little tuft of round, hairy, concave leaves dangling at the extremity, and swaying with every movement of the air. The flowers are like those of the London-pride, but larger and irregular. In addition to the true saxifrages, different kinds of *Mitélla*, the *Heúchera Americána*, and the *Parnássia asarifólia*, are in cultivation.

LXV.—THE CONVOLVULUS FAMILY. *Convolvulaceæ.*

Elegant herbaceous plants, generally either trailing or twining, in which latter case their slender string-like stems often reach many yards in length. Leaves simple, alternate, petiolate, usually undivided, often beautifully heart-shaped. Flowers large, axillary, usually solitary, regular, formed of five petals united into an exquisite bell, shaped like the mouth of a trumpet, as in Fig. 142, and spirally twisted before expansion; in colour white, pink, azure, crimson, or purple, sometimes particoloured, or richly striped at the line of junction of the component petals. Stamens five, on long filaments, inserted in the base of the corolla; pistil solitary, very long; stigma two-lobed; calyx of five sepals, which are often unequal; fruit a four-seeded capsule. Few flowers are more fugitive; many kinds open at daybreak or earlier, attain perfection by sunrise, and wither before noon, unless the sky be overcast.

Fig. 142.
Flower of Convolvulus.

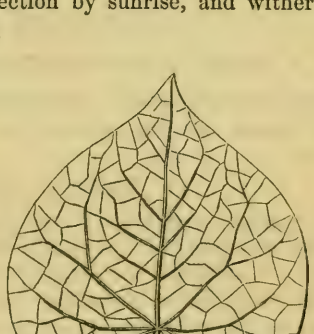


Fig. 143.
Leaf of Convolvulus major.

This beautiful family is abundant in all parts of the tropics, but rare in the colder regions, and at the extreme north entirely unknown. The number of species is between six and seven hundred. The roots abound for the most part with an acrid milky juice, containing a peculiar resin, the action of which is strongly purgative, jalap and scammony being the chief examples. In a few kinds the purgative resin is hardly present, and then the large roots are often remarkable for their sweet and starchy contents, as in the common sweet-potatoe, or "batatas," so important an article of food in tropical countries.

Three species grow wild in England, and two of them near Manchester.

1. Stem twining to the length of many feet over hedges and bushes. Leaves arrow-shaped, the lobes at the base abrupt, as if the points had been cut off; flowers solitary and axillary, on square peduncles, with a pair of large, heart-shaped and leaf-like bracts immediately beneath the calyx; corolla pure white, or sometimes tinged with pink, two or two and a half inches across at the rim ..... } GREAT HEDGE-BINDWEED.

2. Stems rarely more than two feet long, prostrate on the ground, or, if support be at hand, slightly climbing. Leaves ovate-arrow-shaped, the lobes at the base pointed; flowers axillary, usually in pairs, with two or three small bracts at a distance from the calyx; corolla pink, or pinkish-white, often with darker plaits, an inch or a little more in diameter, fragrant, and very pretty ..... } SMALL FIELD-BINDWEED.

HABITATS AND LOCALITIES.

1. GREAT HEDGE-BINDWEED—(*Convólvulus sépium.*)

Hedges in moist ground, common everywhere. A variety with red-striped flowers has been gathered at Whitefield by James Percival, jun. Fl. July—October.

Curtis, i. 13; E. B. v. 313.

In the wild convolvulus we have another example of great beauty of form combined with habits that make the plant a pernicious weed. The flowers are of the chastest white, and among the largest and handsomest of our native Flora; but when once the plant has established itself in a hedge, or among bushes in a garden, every year it twines its strangling roots and stems closer and closer, the mass of foliage becoming so dense as quite to conceal what is underneath, and by degrees to smother and destroy it. To eradicate the plant is almost impossible, without at the same time uprooting its victim. The large white bells, as they hang upon the hedges in dewy autumn mornings, are strikingly beautiful. The reader of Virgil will remember them as the shepherd's "alba ligustra."

2. SMALL FIELD-BINDWEED—(*Convólvulus arvénsis.*)

Dry waysides, among short grass, and in dry fields, rare. Below Bowdon old Church, sparingly. Between Northen and Cheadle. Plentiful in a wood near Parr-fold Farm, Worsley. (J. E.) Abundant between Tyldesley and Little Hulton. (R. H.) Empshaw Lane, Stockport, on a sand-bed by the turning at the Shakspere Inn for Offerton. (Mr. Isaac Williamson.) Bent Lane and Townfield Lane, Warburton, plentiful. (Mrs. Brownell.) Fl. June, July.

Curtis, i. 85; E. B. v. 312.

The garden Convolvulaceæ are almost limited to those two well-known and lovely flowers, the "convolvulus major" and the "convolvulus minor." The former, botanically *Pharbitis purpúrea*, is a native probably of tropical America, and the most beautiful hardy twiner in cultivation. Its magnificent bells present every possible shade of crimson and purple, the latter unequalled in depth and richness, and sometimes vary to pure white. Like many other tropical annuals, they delay their appearance till the close of summer, and almost exhaust the sower's patience, but then make amends in their profusion. Opening by day-break, or even earlier, the flowers last only till the sun is in the mid heavens; but every morning there comes out a renewed supply, and so it continues, in lenient seasons, till beyond October, by which time the plant is hung all over with clusters of capsules, as fecund in its age as in its middle life it was superb. The leaf is of the most elegant and symmetrical heartshape in nature. (Fig. 143.) The "convolvulus minor," botanically *C. tricolor*, is a native of the South of Europe, and takes its name from the charming threefold mixture of colours in the corolla, which is white at the base, yellow in the middle, and azure at the upper or expanded part. The fecundity of this species is equal to that of the "major." No others of the family are grown out-of-doors, but in green-houses we may sometimes see a plant of the brilliant genus *Ipomæa*, resembling an immense "convolvulus major."

LXVI.—THE DODDER FAMILY. *Cuscutáceæ.*

Like the ***Monotropa*** (p. 163) and the toothwort (p. 212), the dodders are *parasites.* They differ, however, from both, in several important particulars. The stems are as fine as thread, and very much branched, and twine round the plants to which they attach themselves in a tangled mass, so as often almost to conceal them. They are annuals, commencing life in the earth, where the seeds vegetate, and whence they climb on to the objects of their attack, attaching themselves by minute tubercles to the surface of the stalks. As soon as they have secured a firm hold, they relinquish their connection with the soil, and steal their sustenance wholly from the victim. The plants selected for attack are heath, furze, thyme, nettles, thistles, flax, clover, &c.: to the latter, when sown as crops, they are exceedingly injurious. In colour these curious parasites are of a pale greenish-yellow, often turning to a lively red, which they retain till after blooming, when they become brown, and shortly afterwards disappear. The flowers are small, regular, pale flesh or yellowish-rose colour, and wax-like, and clustered in compact, nearly globular, lateral heads, the size of a large pea. No leaves are produced at any time, nor even scales.

Dodders are found in the temperate countries of both hemispheres, and though in some cases no more than singular weeds, when upon farm-land they are often destructive pests.

About fifty species are known, five of which are reputed British, but the real number is probably less, as one or two can hardly be deemed more than varieties. Three out of the five have occurred near Manchester.

A.

Corolla with pointed, spreading lobes, and prominent scales. Stem much branched.

1. Calyx shorter than the tube of the corolla; its segments ovate ..... } Furze Dodder.

2. Calyx as long as the tube of the corolla; its segments lanceolate ..... } Clover Dodder.

B.

3. Corolla with short broad lobes, and inconspicuous scales. Calyx nearly as long as the petals. Stem nearly simple. Flowers only about five in a head, and much more fleshy than in the two preceding ..... } Flax Dodder.

HABITATS AND LOCALITIES.

1. Furze Dodder—(*Cúscuta Epithymum.*)

Upon oats at Peover and Baguley, 1858. (Mr. Worthington.) Fl. July, August. Annual.

E. B. i. 55.

2. Clover Dodder—(*Cúscuta Trifólii.*)

In a clover-field at Bredbury. (Mr. Thomas Coward.) Fl. July, August. Annual.

E. B., Supp. iii. 2898 (with beautiful dissections).

Introduced probably from abroad with the seeds of the clover. It is not really distinct, I think, from the *Epithymum*. When its natural victim, the *Trifolium pratense*, is not at hand, it can make itself at home upon many other plants.

3. Flax Dodder—(*Cúscuta Epilinum.*)

In a field of flax near the Cock Inn, Worsley, 1857, plentiful. (J E.) Fl. July, August. Annual.

E. B., Supp. iii. 2850.

LXVII.—THE JESSAMINE FAMILY. *Jasminácea.*

Slender, twiggy shrubs or small trees, with trifoliolate or pinnatifid leaves, the stems sometimes twining. Flowers in corymbs arising from the axils of the leaves, white or yellow, and generally sweet-scented. Calyx of five to eight sepals, united nearly to the top; corolla regular, of the same number of petals, united for the lower half into a tube, in which the two stamens are inserted, and which conceals them from view. Ovary one-celled; style one; stigma two-lobed; fruit either a double berry or a capsule. In some points these plants resemble the *Oleacea* (p. 218), but in that family the flowers are regularly tetramerous in every part, whereas here the parts of the flower bear no precise numerical relation to the stamens. They are natives chiefly of tropical India, in all parts of which they abound. Two belong to Southern Europe, and with several of the Asiatic species have been transplanted into our gardens. The principal are the common white jessamine, or *Jasminum officinále*, so delicious in its odour, and so valuable as consenting to live in town; and the yellow-flowered *frúticans*, *húmile*, *revolútum*, and *nudiflórum*, which last opens its flowers as early as January.

LXVIII.—THE BORAGE FAMILY. *Boragináceæ.*

Herbaceous plants, with simple, undivided, alternate, lanceolate, oval, or heart-shaped leaves, in most cases rough with strong white hairs, the leaf-stalks generally much widened, and merging into the blade. Flowers generally in racemes that are more or less branched, and while young, coiled spirally inwards, but as the blooming proceeds, unrolled and straightened, after the manner of a fern-leaf. (Fig. 145.) Corolla regular, pentamerous, either flat and star-shaped, or tubular and cup-shaped; often with an inner ring of little pointed scales resembling abortive stamens, which they probably are. In a few cases the corolla is rather irregular. Stamens five, inserted on the petals, and alternate with them; pistil one; ovary two or four-lobed, the divisions, when ripe, resembling seeds, and covered, or nearly so, by the persistent calyx. The flowers are of various colours, blue predominating, and the tints generally bright and clear. The blue ones, when in bud, and when they first open, are in many species

of a reddish colour, which subsequently deepens, so that it is not unusual to see blossoms of several different tints in the same raceme. They seldom have any smell. The hairs of many species, when magnified, are found to be placed on little mounds resembling heaps of pearls. In other cases they have a large, round, bulbous pedestal; and occasionally those upon the calyx are hooked at the end.

Fig. 144.
Comfrey.

Fig. 145.
Poets' Forget-me-not.

Of this interesting and beautiful family it is estimated that there are not less than six hundred species. They are natives principally of the temperate countries of the northern hemisphere, especially those of the South of Europe, diminishing both towards the frigid zone and the equator. In properties they are mucilaginous and emollient, on which account several have been valued in rustic medicine. The roots of others furnish reddish dyes. None are deleterious.

Twenty-six species grow wild in England, and twelve of them near Manchester.

THE BORAGE FAMILY.

- **A.—Mouth of the corolla closed by scales. Leaves broadly lanceolate.**
  - Stamens purplish-black, standing in a large prominent cone; flowers sky-blue ..... 1. BORAGE.
  - Stamens standing apart, and concealed in the corolla.
    - Corolla long and tubular. Leaves large, ovate-lanceolate, decurrent. (Fig. 144) 2. COMFREY.
    - Corolla with a spreading limb.
      - Tube of corolla bent; flowers purple, finely veined with white .. 3. FIELD BUGLOSS.
      - Tube of corolla straight; flowers usually sky-blue.
        - Bristles of the calyx straight, and appressed.
          - Limb of the corolla longer than the tube.
            - Calyx spreading; flowers brilliant. (Fig. 145).. 6. POETS' FORGET-ME-NOT.
            - Calyx closed when in fruit; flowers insignificant ..... 9. CREEPING FORGET-ME-NOT.
          - Limb of the corolla not longer than the tube ..... 10. MATTED FORGET-ME-NOT.
        - Bristles on the calyx spreading and hooked.
          - Pedicels almost erect, shorter than the calyx ..... 11. HARLEQUIN-WEED.
          - Pedicels spreading, longer than the calyx.
            - Limb of the corolla flat; flowers shewy..... 7. SYLVAN FORGET-ME-NOT.
            - Limb of the corolla concave; flowers inconspicuous ..... 8. FIELD FORGET-ME-NOT.
- **B.—Corolla without scales.**
  - Stamens enclosed in the corolla.
    - Leaves egg-shaped, spotted with white; stems numerous..... 5. LUNGWORT.
    - Leaves lanceolate, without spots ..... 4. YELLOW GROMWELL.
  - Stamens protruding; flower brilliant blue; plant large and branching ..... 12. VIPER'S BUGLOSS.

HABITATS AND LOCALITIES.

1. Borage—(*Borágo officinális.*)

Escapes occasionally with garden refuse into waste land, but without power seemingly to establish itself for more than a year or two, except where sown. Fl. July—September. Annual.

E. B. i. 36; Baxter, i. 66.

A remarkably curious and elegant plant, deserving much wider cultivation as a garden ornament than it receives. The flat and star-like corollas, of the intensest Italian azure, and the prominent cone of stamens, which are so deeply purple as to seem black, remind us of the blossoms of the potatoe and the nightshade, both of which they closely resemble in figure. The stem is succulent with watery juice, and, when crushed, smells like cucumber. By reason of this, and its singular coldness, the plant was formerly in great repute as a refrigerant. Every part of it is thickly studded with long white transparent bristles, pointed enough to prick the fingers if carelessly gathered. Borage supplies the best illustration easily reached of the four-lobed ovary, separating when ripe, as above described, into four large, dry, seed-like achenia.

2. Comfrey—(*Symphytum officinále.*)

Ditch-banks in the neighbourhood of Jackson's Boat, and elsewhere about Chorlton, but sparingly. Fl. June, July.

E. B. xii. 817; Baxter, ii. 101.

Not infrequent in cottage and farm-house gardens, as at Lymm, Sale, Prestwich, Outwoods, and Strines, being esteemed in rustic medicine, both for man and cattle.

3. Field Bugloss—(*Lycópsis arvénsis.*)

Cornfields and other dry places, rare. About Bowdon, towards Mr. Neild's model farm, and elsewhere in the district extending from there to Didsbury. Fl. June, July. Annual.

Curtis, ii. 309; E. B. xiv. 930; Baxter, i. 21.

4. Yellow Gromwell—(*Lithospérmum arvense.*)

Cornfields, but only as an occasional visitant, and apt to be lost through the changes of crops. Mobberley, 1858. Fl. June, July. Annual.

E. B. ii. 123.

5. Lungwort—(*Pulmonária officinális.*)

In a wood on the left hand of the river Goyt, between Compstall Bridge and Marple Aqueduct. (Mr. J. Sidebotham.) Fl. February—May.

E. B. ii. 118; Baxter, ii. 102.

An exceedingly common garden flower, prized for its early blossoms, red and purple in the same cluster, and for the curious appearance of its white-spotted leaves.

6. Poets' Forget-me-not—(*Myosótis palústris.*)

Edges of rivers and clear streams, loving to sit at the water-lip and bathe its feet, while its blue eyes shine back sweetly from the depths. Found also on the borders of ponds and shallow water-courses. In many places about Stretford, Sale, and Timperley, where it is abundant on the banks of the canal, and in the ditch by the railway, on the right hand, just before coming to the station. Fl. July, August.

Curtis, i. 158 (as *Myosotis scorpioides*); E. B. xxviii. 1973; Baxter, i. 57.

The celebrity of this plant as the emblem of constancy rests popularly upon the legend related in Mill's *History of Chivalry* (i. 315). But the true ground of it lies farther back than the days of tournaments, and is of another nature entirely, as spoken of in "Walks and Wild-flowers," p. 31.

7. Sylvan Forget-me-not—(*Myosótis sylvática.*)

Woods and groves, the prevalent forget-me-not of the district. Pendlebury; Bowdon, near Weybridge Hollow; Cotterill Clough, abundant; Botany Bay-Wood, Worsley; and in the most charming perfection and luxuriance at Styal, and in the woods of the Reddish Valley. (See "Walks and Wild-flowers," chap. vii.) Fl. May.

E. B., Supp. i. 2630.

8. Field Forget-me-not—(*Myosótis arvénsis.*)

Dry fields and hedgebanks, common everywhere. Fl. May, June. Annual.

E. B., Supp. i. 2629.

A pretty little flower, enamelled and brilliant like the preceding, but in size not to compare with them.

9. Creeping Forget-me-not—(*Myosótis répens.*)

Spongy places by sides of ponds and streamlets. Hale Moss, plentiful; Mere Clough; Lindow Common. Fl. June—August.

E. B., Supp. i. 2703.

10. Matted Forget-me-not—(*Myosótis cæspitósa.*)

Ditch-banks, and muddy edges of pools, among rushes and other semi-aquatic plants, but not *in* the water, common. Fl. June—August.

E. B., Supp. i. 2661.

11. Harlequin-weed—(*Myosótis versicolor.*)

Dry fields, and by edges of seldom-travelled roads and grassy-bordered lanes, not uncommon. Plentiful about Chorlton, Baguley, and Carrington. Fl. May, June. Annual.

E. B. vii. 480 (as *M. scorpioides*, the coloured figure).

The flowers are yellow when they expand, and subsequently become blue.

12. Viper's Bugloss—(*Echium vulgáre.*)

In cornfields and other ploughed land, an occasional visitant. Lymm. (Mr. John Moss.) Fl. June, July. Biennial.

E. B. iii. 181; Baxter, iii. 189.

The rough comfrey *(Symphytum aspérrimum)*, a garden plant, was gathered ten or twelve years ago, apparently wild, in a meadow on the left bank of the river Tame, near Bredbury Wood. The evergreen alkanet, or *Anchusa sempervirens*, (E. B. i. 45.) also common in gardens, has likewise occurred, apparently wild, "in a lane near Dunham Park" (B. G.), and in the lane by Mr. Neild's model farm. (Mr. Leigh.)

The finest Borragineæ grown for ornament are the native species already mentioned. In addition to these, there are one or two foreign *Echiums* and *Anchúsas* of great beauty; the *Pulmonária Virgínica;* a little white-flowered annual called Venus' navel-wort, or *Omphalódes linifólia;* an early spring blossom of bright azure, with oval and pointed leaves, and the configuration of a primrose plant, called *Omphalódes verna;* and a remarkable annual, with pendulous clusters of yellowish blossoms, called *Cerínthe*, or honeywort. The three last are remarkable for their glabrous foliage. The choicest of the family, and after the forget-me-not the best-known, is the heliotrope, or *Heliotrópium Peruviánum*, the delightful odour of which flows abundantly from its lilac clusters till the very latest days of autumn, and in conservatories lasts almost all the year. Some people call it "cherry-pie," from the resemblance of the smell.

LXIX.—THE HYDRANGEA FAMILY. *Hydrangeáceæ.*

No species of this family grows wild in England, and only two or three *Hydrángeas* are in common cultivation. The stems are shrubby; the leaves opposite, simple, and exstipulate; the flowers like those of saxifrages, and clustered in cymes or panicles, those in the centre of the inflorescence being small, regular, and perfect; while those at the margin are sterile, and furnished with larger petals than the centre

ones, as happens also in the wild Guelder-rose. Occasionally all the flowers are sterile and enlarged, and then, instead of a simple circle or border of such, there is a dense globular mass, like that of the Guelder-rose when cultivated. This at least is the case in the common species or *Hydrangea hortensis*, which is frequent both in pots in houses, and as a shrub in warm borders under walls. The flowers are either pink or blue. To the same family belong the *Adamia* and the *Bauera rubioides*.

LXX.—THE WAX-FLOWER FAMILY. *Asclepiadaceæ.*

A large family of very extraordinary plants, having its maximum in the southernmost part of Africa, where vast numbers of the succulent species occupy the plains and other dry and sterile places. They abound also in tropical India and New Holland, and in the equinoctial parts of America. They are mostly shrubs, almost always milky-juiced, and often twining, with entire, usually opposite leaves; flowers usually umbellate, the umbels arising from between the petioles of the leaves; and very elegantly symmetrical, pentamerous flowers, distinguished from those of the Convolvulus, Periwinkle, and Potatoe families, to which they are in many respects allied, by having the anthers and stigma consolidated. These parts are not merely in close contact, but actually consolidated into a single body, the centre of which is occupied by the broad disk-like stigma, the grains of pollen cohering in the shape of waxy bodies attached finally to the five corners of the stigma, and adhering to it by the intervention of peculiar glands. The ovaries are two, ripening into a pair of follicles, with numerous seeds, which are almost always covered with long white hairs.

Being altogether foreign, and mostly tropical, the family is represented near Manchester only in the conservatory. The best known species is the wax-flower, or *Hoya carnosa*, its long semi-twining stems provided with abundance of thick, oval, pointed, leathery leaves, and profusion of drooping and sessile umbels of whitish-pink flowers, each with a hard and shining pink star in the centre, moulded, to appearance, out of the finest porcelain, and a gem of transparent honey depending from it like a drop of dew. Next in frequency is the magnificent white-flowered *Stephanotus*, which seems to grow in natural chaplets; and along with it several smaller *Hoyas*, and

a few species of *Asclépias*, *Gomphocárpus*, *Ceropégia*, and *Stapélia*. But these latter are rare. Out of doors is sometimes cultivated the tall, scrambling, purple-flowered *Periplóca Græca*.

LXXI.—THE TRUMPET-FLOWER FAMILY. *Bignoniáceæ*.

The tropics, both of the old and the new world, are the principal habitations of this noble family, which in Europe is unknown in the wild state. It comprises trees, shrubs, and a few herbaceous plants, the latter often of a twining or climbing habit, and it is these which are chiefly in cultivation. They comprise the *Calámpelis* or *Eccremocárpus scaber*, and several different species of *Bignonia*, such as *rádicans*, *Cherére*, and *capreoláta*. The leaves are opposite, and usually pinnate or doubly ternate, and tendrilled; the flowers in panicles, large and handsome, and of various colours, red and yellow predominating, and in the Bignonias distended and "trumpet-shaped." They bear a good deal of external likeness to the Foxglove Family, and in the mere form of the flower there is nothing that will absolutely distinguish them. The difference lies entirely in the seeds, which are provided with a broad and membranous border, and have a large and leafy embryo. Those of one of the great American arborescent species, the *Bignónia echináta*, rank with the most wonderful and beautiful objects of the vegetable kingdom. They are contained in a hard brown pod, seven or eight inches long by two in breadth, and rough over its whole surface with blunted asperities. The pod is divided into two compartments by a kind of loose floor, on either side of which the seeds are disposed in layers, every one of them an inch and a half or two inches in length, and resembling a butterfly with transparent and opened wings. The seeds of the *Calampelis*, procurable at the shops, though small, exhibit equally well the family character. In all the species the corolla is irregular, four or five-lobed, and widened in the throat; the stamens are in reality five, but one of them is always destitute of its anther; the ovary is solitary and two-celled. Out of doors there is sometimes seen a small specimen of that noble tree, the *Catálpa*, known by its large cordate leaves, and when it blooms, which is rarely, by its whitish flowers, with purple and yellow spots.

LXXII.—THE SAGE FAMILY. *Labiátæ* or *Lamiáceæ.*

The Labiatæ constitute one of the largest and most useful, one of the best-marked and most interesting families that Botany is acquainted with. In no family are the species more like one another, and thence more easily identified as members of it; nor in any is there a greater similarity of products, the latter including almost all those aromatic

Fig. 146.
Ground-ivy.

and oily secretions which render mint, sage, thyme, lavender, basil, rosemary, patchouli, bergamot, and a hundred others, so agreeable either as condiments to our food, or as perfumes for our clothing and the atmosphere. Not a single deleterious species occurs in it, while many kinds, by reason of their tonic and stimulating properties, are of high esteem in medicine. Such are horehound, peppermint, balm,

ground-ivy, and calamint. The delicious flavour of Narbonne honey is ascribed to the bees feeding largely on the rosemary and other Labiates of the borders of the Mediterranean; and in our own country, wherever wild thyme abounds, the honey appears to be similarly affected. The species, which are probably not fewer than 2,500, are found in most of the temperate parts of the world, the maximum of their abundance being between the parallels of 40° and 50° north latitude. They grow in hot, dry, exposed situations—on the breezy hill-side, the ledges of the southward-looking cliff, the warm and crumbling bank, loving sunshine and fresh air; occasionally also in marshy places and by the sides of ponds. So close is the resemblance of the different species in point of structure, that the

Fig. 147.
Hedge Wound-wort.

Fig. 148.
Didynamous stamens.

Fig. 149.
Lip-shaped flower.

family might almost be regarded as one vast genus. Minutely as they have been examined, the precise limits of many of the genera are yet unsettled. Reduced to a technical form, the structure is as follows:—

Herbaceous or undershrubby plants, the stems for the most part four-sided, especially when succulent, and with opposite branches. Leaves invariably opposite and simple, varying in outline from narrow-lanceolate to oval and broadly heart-shaped, in a few cases pinnatifid, and often elegantly serrated or crenate. The best examples of the crenate leaf are furnished by the betony and the ground-ivy. (The leaves are very apt to be strewn with minute bags of aromatic oil,

plainly visible under the microscope, and of different colours in different species, green or yellow being the most usual. It is through the crushing of these little bags of liquid perfume, and the escape of the contents, that the fingers become fragrant after rubbing the foliage of such as the bergamot.) Flowers clustered in the axils of the leaves, usually sessile and very numerous, whence it appears as if they were whorled. Sometimes, instead of being axillary in the main foliage of the plant, they stand in many little rings in the axils of bracteas at the upper extremity of the stem, forming loose open spikes or pyramids, that taper off nearly to a point. (Fig. 147.) If the upper part of the plant be much branched, the inflorescence assumes the

Fig. 150.
White Dead-nettle.

figure of a panicle, as happens in the germander. When axillary in the main foliage, the clusters are often so dense as to form convex and nearly solid rosettes, the stem rising through the centre; and if the corollas be large and hooded, as in the yellow dead-nettle, they form a little verandah, running all round the stem. Occasionally the flowers grow in axillary pairs, and there are instances where they are axillary and solitary. The calyx is tubular, often ribbed, either with two lips or five pointed teeth. The corolla is usually very irregular, more or less mouth-shaped, and deeply cleft (Fig. 149), the upper lip often very large, and either flat, or arched and concave, sometimes

exceedingly minute, and the lower lip the principal part of the flower. Stamens four, usually two long ones and two short ones; sometimes, by defect, only two in all. In the former case they are called "didynamous." (Fig. 148.) Pistil one; stigmas two; ovary four-lobed, when ripe separating into four little dry and one-seeded achenia, which lie like naked seeds at the bottom of the persistent calyx. The calyx, like the leaf, is often thickly sprinkled with bags of oil, and (as in the common garden sage) forms an exquisite object for microscopical examination. Parti-coloured flowers are frequent in this family, and in many species the anthers are of some unusual and vivid tint. The fragrance which distinguishes the aromatic kinds is in a few cases exchanged for repugnant fœtor, as in the black horehound and the hedge wound-wort. It is to be observed that the upper lip of the corolla, consisting of two united petals, is opposite the three united sepals of the two-lipped calyx; and that the two united sepals which form the upper half of the calyx, are opposite the three united petals of the corolla.

Fifty-eight species grow wild in England, of which there are found near Manchester twenty-seven, or nearly one half, the absent ones being such as love limestone. The wild thyme, that forms those sweet and springy beds on which we seat ourselves to admire the sea at Clevedon or Peel Castle, is here unknown; the wild marjoram and the vervain-sage are sought in vain; Manchester, however, possesses some of the very handsomest as to flowers.

Section 1.

Flowers yellow, white, or buff-colour, sometimes freckled with darker colours.

A.

Flowers in lateral panicles, all pointing one way; corolla pale straw-colour, the upper lip absent; stamens purplish-red, protruding. Leaves oval, puckered, stalked ..... 9. Common Germander.

B.

Flowers mingled with leaves, in loose, pyramidal, terminal heads; calyx prickly; stem swollen at the joints, and rough with reflexed bristles. Leaves egg-shaped, deeply serrate, pointed, and stalked.

Corolla half an inch long, inconspicuous; flowers white ..... 17. Common Hemp-nettle.

Corolla an inch long, pale yellow, with a large violet spot on the lower lip ..... 18. Large Variegated Hemp-nettle.

C.

Flowers in axillary whorls.
Corollas small, very numerous, white.
Plant thickly covered with white cottony hairs; leaves nearly circular, much wrinkled, and stalked. Stamens four ..... 27. White Horehound.
Plant nearly glabrous; leaves ovate-lanceolate, nearly sessile, serrate, sometimes pinnatifid at the base. Stamens two ..... 1. Gipsy-wort.
Corollas large, hairy, an inch long, conspicuous. Leaves heart-shaped, serrate, pointed, and stalked.
Flowers white; anthers black. (Fig. 150) ..... 13. White Dead-nettle.
Flowers full rich yellow; lower lip with orange-brown streaks like a tiger's skin..... 12. YellowDead-nettle.

Section 2.

Flowers red, pink, lilac, purple, or blue; sometimes a little mottled and freckled with white.

A.

Whorls of flowers all, or nearly all, collected at the upper part of the stem, above the principal foliage of the plant.

* *Leaves round or heart-shaped.*

Stem rough with reflexed and sharp bristles, and swollen beneath the joints; calyx prickly; flowers small, dull red ..... } 17. Common Hemp-nettle.
Stem glabrous, or clothed with soft hairs.
Leaves all sessile, broadly ovate or circular; spike oblong; flowers nearly regular, pink..... 2. Round-leaved Mint.
Lower leaves, or all, on long stalks.
Upper leaves crowded, with flowers intermingled, into a terminal and pyramidal head. Leaves triangular, pointed, serrated, downy. Corolla purplish-red.
Leaves moderately serrate ..... 14. Common Red Dead-nettle.
Leaves deeply and coarsely serrate ..... 15. Cut-leaved Dead-nettle.
Upper leaves not crowded as above.
Whorls collected into dense round heads. Leaves with short stalks.
Long linear bracts interspersed among the flowers; calyx thirteen-ribbed ..... 8. Hedge Calamint.
No bracts; corolla nearly regular ..... 4. Hairy Water-mint.
Whorls collected into long, pyramidal spikes. Leaves with long stalks. Stem two to three feet high. Plant fœtid. (Fig. 147) 21. Hedge Wound-wort.

** *Leaves oblong or lanceolate.*

Flowers fine blue or deep violet (occasionally but rarely white).
- Flowers in a short, dense, cylindrical spike, with broad bracts under each whorl. Filaments forked, the anther on the inner prong ..... 24. Self-heal
- Stem with long procumbent branches, spreading from the base; upper leaves in cross pairs, rendering the inflorescence pyramidal while young. Upper part of the plant with a purplish-blue tinge ..... 10. Common Bugle.

Flowers red or reddish-pink, never blue or violet, in elongated and cylindrical spikes.
- Plant glabrous, or nearly so; leaves on short stalks 3. Peppermint.
- Plant covered with hairs, which often make it coarse and rough.
  - Lower leaves on long stalks, and all of them crenate; lowest whorl of the spike of the flowers considerably below the upper ones. Stem few-leaved, one to two feet high .... 19. Betony.
  - Leaves with very short stalks. Stem two to three feet high. Root tuberous. Flowers about sixteen in a whorl ..... 20. Long-leaved Wound-wort.

B.

Flowers chiefly or entirely in the axils of the principal leaves; never exclusively in terminal heads.

Flowers fine blue or deep violet (rarely white).
- Flowers about three in each axil.
  - Leaves heart-shaped or kidney-shaped, crenate, on long stalks, hairy. Plant with long trailing branches, and strong scented. (Fig. 146.).. 23. Ground-ivy.
  - Leaves narrow-ovate, scarcely more than half an inch long, slightly toothed. Calyx two-lipped 7. Basil Thyme.
- Flowers in axillary pairs, and all turned one way. Leaves ovate-lanceolate, nearly sessile, slightly toothed. Plant scentless ..... 25. Blue Skull-cap.

Flowers red, pink, or pale lilac, never fine blue or deep violet.
- Leaves entire, or very nearly so.
  - Flowers in dense whorls. Plant prostrate, much branched..... 6. Pennyroyal.
  - Flowers only one or two in each axil..... 26. Small Scull-cap.
- Leaves serrate.
  - Upper leaves closely sessile, stem-clasping, five-lobed; lower ones on very long petioles, obtusely crenate..... 16. Henbit.
  - Leaves all stalked.
    - Corolla scarcely longer than the calyx. Plant seldom a foot high..... 22. Field Wound-wort.
    - Corolla twice as long as the calyx.
      - Stem two feet high. Flowers all turned one way. Plant fœtid ..... 11. Black Horehound.
      - Stems much branched, seldom a foot high. Plant aromatic ..... 5. Cornfield Mint.

HABITATS AND LOCALITIES.

1. Gipsy-wort—(*Lycopus Europæus.*)

On the banks of ditches, common. Plentiful about Styal and Carrington Moss. Fl. July—September.

Curtis, i. 147; E. B. xvi. 1105; Baxter, iii. 167.

The little white blossoms are dotted with red.

2. Round-leaved Mint—(*Méntha rotundifólia.*)

Formerly found at Greenfield, about a mile from Bill's-o'-Jack's, but a plantation now covers the spot, and it is uncertain whether the plant is any longer to be seen there. Fl. August, September.

E. B. vii. 446.

Occasionally grown in gardens.

3. Peppermint—(*Méntha piperíta.*)

Wet ditch-banks, rare. Plentiful below Chaddock Hall, also at Ellenbrook and Shakerly. (J. E.) Reddish, and between Bowdon and Rostherne. "Clayton Vale." (B. G.) Fl. August, September.

E. B. x. 687.

4. Hairy Water-mint—(*Méntha hirsúta.*)

In ditches, and on the borders of ponds and marshes, abundant everywhere. Very fine at Lymm, on the margin of the Upper Dam. Fl. August, September.

Curtis, iv. 623; E. B. vii. 447; Baxter, v. 398.

5. Cornfield Mint—(*Méntha arvénsis.*)

Cornfields, everywhere. Fl. June—September.

E. B. xxx. 2119.

6. Pennyroyal—(*Méntha Pulégium.*)

Mausolee Common, near Tyldesley, formerly in plenty, but now scarce (J. E.), the only station known for it near Manchester. Fl. end of summer.

E. B. xv. 1026.

7. Basil Thyme—(*Acinos vulgáris.*)

Dry places about Bowdon, common. Fl. July, August. Annual.

Curtis, i. 43; E. B. vi. 411 (both as *Thymus Acinos*); Baxter, vi. 479.

8. Hedge Calamint—(*Clinopódium vulgáre.*)

Dry hedgebanks, very rare, being a plant loving limestone. Cheadle, Baguley, and about Congleton. Fl. July, August.

E. B. xx. 1401; Baxter, v. 346.

9. Common Germander—(*Teúcrium Scorodónia.*)

Dry hedgebanks, and in heathy and stony places, in profusion everywhere. Fl. July—September.

Curtis, ii. 332; E. B. xxii. 1543; Baxter, i. 22.

An elegant and conspicuous plant of the autumn. The withered stems, with their little brown calyces, remain till the following spring. From the resemblance of the leaves to those of the *Salvia officinalis*, it has acquired the popular but erroneous name of "wood-sage."

10. Common Bugle—(*Ajuga réptans.*)

Moist meadows; on slopes towards water or marshy places; by shady waysides; and by paths in woods and groves, beneath the shelter of trees, common everywhere. Fl. May, June.

Curtis, i. 116; E. B. vii. 489; Baxter, ii. 94.

The blossoms occasionally vary to white, and I have found it with the blue of the flowers and stalks exchanged for light red.

11. Black Horehound—(*Ballóta nigra.*)

Dry hedgebanks. Bowdon, but rather uncommon; Barton (J. E.); Stand and Pilkington. (J. P.) Fl. July, August.

E. B. i. 46; Baxter, ii. 86.

Like most of the other red-flowered Labiates, it is sometimes found with the corollas white.

12. Yellow Dead-nettle—(*Galeóbdolon lúteum.*)

Woods and thickets, common. Cotterill; Ashley; banks of the Irwell, near Clifton; and in the highest luxuriance and most delightful golden profusion in the Hen-pen Woods, Worsley; in the woods at Styal, and in some parts of the Reddish Valley. Fl. May, June.

Curtis, ii. 260 (as *Galeóbdolon Galeópsis*); E. B. xi. 787; Baxter, iii. 194.

13. White Dead-nettle—(*Lámium álbum.*)

Hedgebanks, rare. Stretford, Ashley, Lymm, Warburton, Mobberley, but in every place sparingly. In the lane leading from Didsbury to the path on the banks of the Mersey. Tyldesley (J. E.); Bramhall (Mr. Isaac Williamson); Weaste Lane, and by the side of the high road at Eccles. (J. S.) Fl. April, May.

Curtis, i. 118; E. B. xi. 708; Baxter, i. 31.

Remarkable for its black anthers.

14. Common Red Dead-nettle—(*Lámium purpúreum.*)

By waysides and on the borders of ploughed fields, a common weed everywhere, commencing to bloom in February, and continuing, more or less, till the close of summer. Annual.

Curtis, i. 42: E. B. xi. 769.

15. Cut-leaved Dead-nettle—(*Lámium incísum.*)

In similar situations, tolerably common, but not universal. Plentiful about Withington and Bowdon. Fl. May, June. Annual.

E. B. xxvii. 1933.

This can hardly be deemed anything more than a variety of the preceding.

16. Henbit—(*Lámium amplexicaúle.*)

In cultivated ground, as a weed, not uncommon about Bowdon and Ashton-upon-Mersey. Fl. May, June. Annual.

Curtis, i. 119; E. B. xi. 770.

The dead-nettles are remarkable for their hairy anthers, and the frequently vivid colour of their pollen. In *Lamium purpureum* and *amplexicaule* it is the colour of red-lead or vermilion.

17. Common Hemp-nettle—(*Galeópsis Tétrahit.*)

Borders of cornfields, and in other dry ploughed land, also in woods, common. Fl. July—September. Annual.

Curtis, iv. 624; E. B. iii. 207.

18. Large Variegated Hemp-nettle—(*Galeópsis versicolor.*)

In ploughed land, especially potatoe fields and cornfields. Abundant about Carrington, and in the whole district between that and Wilmslow and Alderley. Mobberley, fine and plentiful. (Mr. Holland.) Fl. July—October. Annual.

Curtis, ii. 402; E. B. x. 667; Baxter i. 75.

One of the most splendid of our native wild-flowers.

19. Betony—(*Betónica officinalis.*)

Dry fields, and in rough bushy places, common. Fl. July—September.

Curtis, i. 178; E. B. xvi. 1142; Baxter, iii. 214.

Betony is at once distinguished from all our other red-flowered Labiates by the lowest whorl of flowers, forming the spike, being at a considerable distance below, and with a pair of leaves underneath it. Occasionally found white.

20. Long-leaved Wound-wort—(*Stáchys palústris.*)

Moist cornfields, by ditch-banks, and in other wet places, common. Fl. July, August.

Curtis, i. 180; E. B. xxiv. 1675; Baxter, i. 16.

The variety of this plant, formerly called *Stáchys ambigua*, (E. B. xxx. 2089.) is abundant about Strines, and by the stream in the upper part of Mere Clough. Found also in clayey fields at Ashley. (Mr. Hunt.)

21. Hedge Wound-wort—(*Stáchys sylvática.*)

Damp hedges, and in brambly woods, common everywhere. Fl. June, July.

Curtis, i. 179; E. B. vi. 416 (too red).

A plant of excessively noisome odour, and said to be beloved of toads.

22. Field Wound-wort—(*Stáchys arvénsis.*)

Cornfields and waste ground. Common about Bowdon. Fl. August, September. Annual.

Curtis, ii. 261; E. B. xvii. 1154.

23. Ground-ivy—(*Glechóma hederácea.*)

Dry hedgebanks, common everywhere. Fl. April, May.

Curtis, i. 117; E. B. xii. 853; Baxter, ii. 136.

An elegant little plant, recognised in early spring, not sooner by the deep violet-blue of its flowers, heart-shaped and crenate leaves, and long and straggling stems, than by its powerful and rather unpleasant odour. It may always be known by its anthers, which are curved, and placed back to back, so as to present the figure of two little white X's, or rather of two semi-circles, thus,)(. The calyx is fifteen-ribbed, the basil-thyme and hedge-calamint having it thirteen-ribbed, and most Labiatæ either five or ten-ribbed.

24. Self-heal—(*Prunélla vulgáris.*)

Moist waysides, common everywhere. Fl. July, August.

Curtis, ii. 262; E. B. xiv. 961; Baxter, i. 67.

The flowers vary from deep violet to a pretty rose-colour, and are occasionally white. The broad bracts underneath them distinguish the plant in an instant.

25. Blue Skull-cap—(*Scutellária galericulàta.*)

On wet ditch-banks and the rushy borders of ponds, not uncommon. Plentiful towards Carrington Moss, and on the borders of Rostherne Mere, in the wood next the Chester Road, and in the plantations on the side opposite the Church. Mere Clough; Reddish; Leigh. Abundant on the banks under the yew hedge at Mobberley old Hall. Fl. June—August.

Curtis, i. 181; E. B. viii. 523 (too red); Baxter, i. 12.

Characterized by its pairs of large, pretty blue flowers, in the axils of the upper leaves, and all pointing one way.

26. Small Skull-cap—(*Scutellária mínor.*)

Heathy moors, rare. Plentiful in a marshy place on the right hand side of the road ascending to Bill's-o'-Jack's, Greenfield, not far from the brook-side, and about half-a-mile before reaching the house,—the same locality as that of the *Hypericum Elodes*. Found also on Lindow Common and Hale Moss. Fl. July, August.

Curtis, ii. 263; E. B. viii. 524.

27. White Horehound—(*Marrúbium vulgáre.*)

Waste places and waysides about Mobberley. Lane leading from Mobberley Church to Tipping's Brow. Fl. August.

E. B. vi. 410.

Some suppositious species of *Mentha* have been found at Chorlton, &c.; and as soon as Congleton and the limestone districts of Derbyshire are approached, beyond Disley and thereabouts, but rather further than the limits of our Flora, the wild-thyme and the wild-marjoram make their appearance. (*Thymus Serpyllum*, Curtis, i. 120; and *Origanum vulgare*, Curtis, ii. 331.)

In the Labiatæ are comprised most of the kitchen-garden plants known as "pot-herbs," and nearly all that are valued for their aromatic secretions, viz.:—

Common or Spear-mint	*Mentha viridis.* (E. B. xxxiv. 2424.)
Bergamot	*Mentha citrata.*
Pennyroyal	*Mentha Pulegium.*
Peppermint	*Mentha piperita.*
Common Sage	*Salvia officinalis.*
Marjoram	*Origanum Majorana.*
Common Thyme	*Thymus vulgaris.*
Lemon Thyme	*Thymus citriodorus.*
Basil	*Ocymum minimum.*
Balm	*Melissa officinalis.*
Rosemary	*Rosmarinus officinalis.*
Lavender	*Lavandula spica.*
Hyssop	*Hyssopus officinalis.*
Savory	*Satureja montana.*

There is a long list also of ornamental species, some of them of singular beauty. Such are the crimson and fragrant *Monarda didyma;* the blazing scarlet *Salvias*, including *S. fulgens*, with the calyx green, and *S. splendens*, in which it is of the same colour as the corolla; the deep blue *Salvia patens*, and the curious plants called clary, or *Salvia Sclarea* and *Salvia Horminum*. Among the commonest are the blotch-leaved dead-nettle, or *Lamium maculatum*, and the blue germander, or *Teucrium Polium*, with hoary foliage. There are species also of the genera

Phlomis, *Stachys*, *Dracocephalum*, *Betonica*, and *Melissa*; the *Lavandula pinnata*, and the *Coleus Blumeii*, the latter an occupant of the green-house, and distinguished by its ovate, serrate, and pointed leaves having the centre occupied by a deep reddish-brown stain. The flowers are blue, and borne in a long upright raceme.

LXXIII.—THE THUNBERGIA FAMILY. *Acanthàceæ.*

The Acanthaceæ, like many other families, are almost exclusively tropical in their native stations, where they constitute a large part of the weedy herbage. In a very few instances do they advance northwards, the celebrated *Acanthus* of Greece, the plant which gave to Callimachus the idea of the Corinthian capital, being the only case in which the family is represented in Europe. They are of very slender importance economically, but often in their blossoms of the most rare and delicious beauty. Every grower of hot-house flowers knows that elegant climber, the *Thunbérgia*, with large, flat, buff-coloured or white corollas, and a dark spot in the centre; also the splendid *Justicias* and *Apheländras*, the charming *Ruéllias*, and the *Crossándra*. In the majority of cases these handsome plants may be recognized by the abundance of their large and leafy bracts, two or three of which accompany every flower, and by the calyx being composed of four or five deeply imbricated sepals. The corolla, as in the other families of this alliance, is formed of four or five united petals, and rather irregular; the stamens, which are inserted on the corolla, are usually two, but sometimes four, and then didynamous; the ovary is solitary, free, and two-celled. The calyx, in the genus *Thunbérgia*, is reduced to a mere ring, and its place supplied by the characteristic bracts. The leaves are opposite, simple, undivided, and entire, or occasionally, as in the case of the classical *Acanthus*, beautifully lobed and waved.

LXXIV.—THE FOXGLOVE FAMILY. *Scrofulariàceæ.*

The plants of which the foxglove is the type constitute one of the largest and most widely diffused families of Botany. The species amount to nearly 2,000, and are found everywhere, from Melville Island to Tierra del Fuego; no country is too hot, or too cold, or too ungenial for them. They are mostly herbaceous, though in a few cases undershrubby; usually scentless, but occasionally, as in the

Scrofularia, fœtid, or, as in the musk plant, aromatic. Many of the English and commonly cultivated species are notorious for their ill scent when bruised or broken. The blossoms are generally handsome and attractive. In properties they are acrid, bitterish, purgative, and emetic, many having the secretions so highly concentrated, as happens with the "Digitalis," that they become valuable in the hands of the physician. Structurally they are characterised as follows:—

Leaves either scattered, opposite, or whorled. Flowers axillary, or in racemes, dichotomous panicles, or spikes. Calyx of four or five sepals, more or less united, and often unequal, the upper sepal being the largest, and the two lateral ones the smallest. Corolla of four or five petals, either slightly united at the base, or completely, into a tubular form, and always more or less irregular. Stamens usually four, two long and two short ones, sometimes only two, and attached to the inner surface of the corolla; in a few cases there are as many

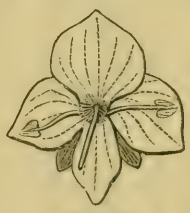


Fig. 151.
Flower of Veronica (magnified).

as five. Ovary single, with a solitary style; fruit a two-celled capsule, which opens when ripe, by little valves, and allows the abundant seeds to fall to the ground. The flowers are very frequently of gay and attractive colours, and not seldom have two or more colours intermingled in the same corolla, but they are rarely endowed with sweet smell. Some of the oddest varieties of the irregular corolla occur among them, as the pocket-like, in the *Calceolaria*, and the "personate" or mouth-like, in the snapdragon, which, by gentle pressure at the sides, opens and closes like the muzzle of a quadruped. The resemblance is continued into the capsule.

Fifty-five species grow wild in Britain, twenty-seven of them occurring near Manchester. They are conveniently resolvable into—

Sec. 1. Species with four stamens, two long and two short;
" 2. Species with two stamens, or the genus *Veronica* (Fig. 151);
" 3. Species with five stamens, or the genus *Verbascum*.

- A.—Leaves pinnatifid, the lobes toothed and cut; calyx inflated; corolla rose-coloured.
  - Stem solitary, erect, twelve to eighteen inches high ..... 17. Tall Red-rattle.
  - Stems numerous, procumbent, four to eight inches long ..... 18. Procumbent Red-rattle.
- B.—Leaves undivided or lobed; entire or serrate; but never pinnatifid.
  - *a.* Peduncles radical, shorter than the petioles of the lanceolate-oval leaves ..... 25. Limosella.
  - *b.* Flowers axillary and distant.
    - Stem upright, its branches opposite, horizontal, and straggling; leaves lanceolate, opposite; flowers yellow, in unilateral pairs ..... 16. Sylvan Cows'-wheat.
    - Stems trailing; leaves mostly alternate.
      - Leaves cordate, five-lobed, petiolate, glabrous, purple underneath; stems long and thread-like ..... 24. Ivy-leaved Toad-flax.
      - Leaves broadly hastate, acute, and hairy ..... 23. Arrow-leaved Toad-flax.
  - *c.* Flowers in spikes, panicles, or racemes.
    - Leaves scattered.
      - Leaves ovate-lanceolate, crenate, crumpled, veiny, and downy; flowers crimson, drooping, in unilateral spikes ..... 21. Foxglove.
      - Leaves linear, entire, glaucous; flowers yellow and orange; corolla tailed ..... 22. YellowToad-flax.
    - Leaves opposite, upper ones sometimes alternate, and all serrate.
      - Leaves lanceolate.
        - Flowers dull red, in erect, unilateral racemes ..... 13. Red Bartsia.
        - Flowers yellow, in lax heads; calyx inflated ..... 15. Yellow-rattle.
      - Leaves ovate or cordate.
        - Corolla white, variegated with violet and yellow ..... 14. Eye-bright.
        - Corolla dingy reddish-brown.
          - Stem with obtuse angles; leaves pointed; panicles loose ..... 19. Knotty Figwort.
          - Stem with winged angles; leaves obtuse; panicles close ..... 20. Water Figwort.

THE FOXGLOVE FAMILY.

Section 1.

THE FOXGLOVE FAMILY.

SECTION 2.

- **A.—Flowers in racemes or bracteated spikes.**
  - Flowers in terminal spikes; the upper leaves gradually reduced to bracts; the latter numerous.
    - Leaves broadly ovate, nearly entire, very obtuse, and glabrous ..... 2. THYME-LEAVED SPEEDWELL.
    - Leaves ovate or cordate, serrate, pointed, and hairy ..... 1. SPIKED FIELD SPEEDWELL.
  - Flowers in axillary and leafless racemes.
    - Plant glabrous.
      - Racemes alternate. Leaves linear, slightly toothed; pedicels much divaricated. Capsule large, flat, and circular 3. NARROW-LEAVED BOG SPEEDWELL.
      - Racemes opposite; plant succulent.
        - Leaves lanceolate, serrate, pointed; flowers small, pink or blueish ..... 4. GREAT WATER SPEEDWELL.
        - Leaves elliptical, entire, obtuse; flowers large, bright blue ..... 5. BROOKLIME.
    - Plant more or less hairy.
      - Stem hairy all round; leaves broadly-ovate, petiolate, serrate.
        - Racemes compact, many-flowered; capsule obovate ..... 6. MEDICINAL-TEA SPEEDWELL.
        - Racemes very lax, straggling, and few-flowered. Capsule circular, dilated, much larger than the calyx ..... 8. WOOD SPEEDWELL.
      - Stem with two opposite rows of hairs; leaves ovate, sessile, serrate; flowers large, bright azure ..... 7. GERMANDER SPEEDWELL.
- **B. — Flowers axillary and solitary. Leaves uniform.**
  - Sepals cordate at the base. Leaves five to seven-lobed, the central lobe largest, entire. Capsule two to four-seeded. Flowers minute. Stems trailing ..... 9. IVY-LEAVED SPEEDWELL.
  - Sepals ovate or lanceolate; capsule many-seeded; leaves cordate, ovate, serrate.
    - Capsule twice as broad as long, compressed. Flowers large, bright blue 12. BUXBAUM'S SPEEDWELL.
    - Capsules little broader than long; flowers minute.
      - Sepals oblong; flowers white or pink ..... 10. GREEN FIELD SPEEDWELL.
      - Sepals ovate; flowers blue, larger than in the preceding, and the seeds more numerous ..... 11. GRAY FIELD SPEEDWELL.

SECTION 3. (Genus *Verbascum.*)

Stem stout, erect, simple or branched, two to five or six feet high. Leaves oblong, pointed, the lower ones often stalked, and six or eight inches long, the upper ones sessile or decurrent, and the whole covered with a soft gray fleece that makes them look as if made of flannel. Flowers sessile, in a dense, woolly, terminal spike of one or two feet long. Corolla large, five-lobed, flattish, nearly regular, and bright yellow; three of the stamens clothed with yellowish and woolly hairs..... 26. GREAT TORCH-MULLEIN.

In habit like the preceding, but neither so stout nor so tall, and either glabrous or with only a few glandular hairs at the upper part. Leaves oblong, coarsely toothed or sinuate. Flowers yellowish, pedunculate, in a long, loose, simple and bracteated raceme. Hairs of the stamens purple. Peduncles longer than the calyx..... 27. MOTH-MULLEIN.

HABITATS AND LOCALITIES.

1. SPIKED FIELD SPEEDWELL—(*Veronica arvénsis.*)

Dry fields and upon walls, common. Fl. May, June. Annual.

Curtis, i. 74; E. B. xi. 734.

2. THYME-LEAVED SPEEDWELL—(*Veronica serpyllifólia.*)

Ploughed fields and waysides, common everywhere. Fl. May—July.

Curtis, i. 3; E. B. xv. 1075.

3. NARROW-LEAVED BOG SPEEDWELL—(*Veronica scutellàta.*)

Sides of ponds, and marshy places, rather rare. Chorlton; Withington; Hale Moss; Ringway; Old Trafford; Levenshulme. Abundant about Worsley and Bedford. (J. E.; R. H.) Fl. June, July.

Curtis, ii. 295; E. B. xi. 782.

A variety occurs, but very rarely, with the stems somewhat downy. Few plants are more graceful.

4. GREAT WATER SPEEDWELL—(*Veronica Anagàllis.*)

Sides of ponds and in ditches, rare. Baguley; ditches in Statham Eye, near Lymm; about Leigh, Worsley, and Bedford. (J. E.; R. H.) In ditches near Ringway Chapel, where it grows nearly a yard high, and has large pink flowers. Plentiful in Dallam Brook, near Warrington. Fl. June, July.

Curtis, ii. 294; E. B. xi. 781 (coloured too blue for our plant).

5. Brooklime—(*Veronica Becabúnga.*)

Wet ditches, and in shallow moving water, such as watercresses inhabit, common everywhere. Fl. June, July.

Curtis, i. 75; E. B. x. 655.

6. Medicinal-tea Speedwell—(*Veronica officinális.*)

Dry sandy ground, and at the edges of dry, little-frequented lanes, especially about Chorlton and Baguley. Dunham Park, among the grass. Fl. May, June.

Curtis, i. 146; E. B. xi. 765.

7. Germander Speedwell—(*Veronica Chamædrys.*)

Everywhere on hedgebanks, flowering in company with the hawthorn in May and June.

Curtis, i. 2; E. B. ix. 623; Baxter, i. 50 (unfortunately coloured slate instead of azure).

The flowers are the largest and most brilliant of any English speedwell, and well known to every one, giving myriads of blue eyes to the hedgebanks in early summer. They soon fall off, and from their lovely hue, are often mistaken for the forget-me-not. Many plants of less beauty are tended in gardens with the utmost solicitude. In wet weather and towards evening the corollas are apt to close, and shew their white undersurfaces.

8. Wood Speedwell—(*Veronica montána.*)

Damp woods and cloughs, common. Abundant in Mere Clough, and in all the woods about Prestwich and Agecroft. Fl. May, June.

Curtis, ii. 219; E. B. xi. 766.

Remarkable, like the *Veronica scutellata*, for the large, flat, circular, shield-like capsules. At first sight this plant might be mistaken for a small and poor state of the germander speedwell, but in that the leaves are sessile, whereas in the wood speedwell they are stalked. Besides, the germander speedwell has two opposite rows of hairs upon the stem, which cross at each joint, to the opposite side, as in the chickweed (p. 145), but here the stem is hairy all round. The lax, straggling racemes of ripening capsules are very conspicuous, and quite unlike those of the *Chamædrys*.

9. Ivy-leaved Speedwell—(*Veronica hederæfólia.*)

Ploughed land, everywhere, an idle and unremitting weed. Fl. March, April. Annual.

Curtis, i. 73; E. B. xi. 784.

10. Green Field Speedwell—(*Veronica agréstis.*)

Cultivated ground, both farm and garden, common. Fl. May, June. Annual.

Curtis, i. 1; E. B., Supp. i. 2603.

11. Gray Field Speedwell—(*Veronica polita.*)

In similar situations, common. Plentiful in gardens about Rusholme. Fl. May, June. Annual.

E. B. xi. 783 (as *Veronica agrestis*).

These two can hardly be considered distinct. Many specimens occur which may be referred to either.

12. Buxbaum's Speedwell—(*Veronica Buxbaumii.*)

As a weed, in gardens and other cultivated ground, but rather rare; probably an introduced plant. Plentiful at Sale and Ashton-upon-Mersey in 1858. In the garden at Rose Hill, Northen, the residence of Absalom Watkin, Esq., sparingly, 1858. Occasionally about Eccles. (J. S.) Between Whalley Range and Chorlton. (Mr. Leigh.) Fl. May, June. Annual.

E. B., Supp. ii. 2769.

Immediately distinguished from the two preceding by the large size of its flowers, which resemble those of the germander speedwell;—by the peduncles being twice as long as the leaves; and the greater hairiness of the entire plant.

13. Red Bartsia—(*Bartsia Odontites.*)

Cornfields, and especially upon their borders, among the weeds. Also by waysides, where somewhat grassy. Fl. July—September. Annual.

Curtis, i. 44 (as *Euphrasia Odontites*); E. B. xx. 1415; Baxter, iii. 223.

Occasionally found with white flowers.

14. Eye-bright—(*Euphrásia officinális.*)

Dry pastures, heaths, and on the slopes of green hills, frequent. Fl. July—September. Annual.

Curtis, ii. 334; E. B. xx. 1416; Baxter, i. 72.

15. Yellow-rattle—(*Rhinánthus Crista-gálli.*)

Among the mowing-grass, everywhere. Fl. June. Annual.

Curtis, ii. 335; E. B. x. 657; Baxter, iv. 259.

A lively and pretty ornament of the young hay-fields, but believed to encumber the crop rather than to enrich it. Along with the two preceding and the next species, and all of their respective genera, it is thought by some to be parasitic on the roots of the plants among which it grows. The leaves are gray upon the underside, and ornamented with a curious net-work of green veins.

16. Sylvan Cows'-wheat—(*Melampyrum praténse.*)

Woods and thickets, frequent in most places. Plentiful in and about Mere Clough, and in the woods at Norcliffe, near Styal. A white-flowered variety grows abundantly by the sides of the road between Hayfield and Kinder Scout. Fl. July, August. Annual.

E. B. ii. 113.

17. Tall Red-rattle—(*Pediculáris palústris.*)

Wet, marshy, and swampy ground, but rather uncommon. By Rostherne Mere, and plentiful on Hale Moss. Fl. July.

E. B. vi. 399.

18. Procumbent Red-rattle—(*Pediculáris sylvática.*)

Swampy, uncultivated ground, and in moist and heathy pastures, common. Fl. June—August.

E. B. vi. 400; Baxter, iv. 266.

A variety with white flowers, more beautiful even than the ordinary state of the plant, occurs not infrequently. Mr. Shaw finds it common about Irlam.

The Latin specific names of this plant and of the *Melampyrum pratense* would seem to have been accidentally transposed, for the *Melampyrum* is a woodland instead of a meadow plant; while the *Pedicularis*, so far from being sylvan, is always found in open, unshaded places.

19. Knotty Figwort—(*Scrofulária nodósa.*)

Moist ditch-banks, common everywhere. Fl. July, August.

E. B. xxii. 1544; Baxter, v. 385.

20. Water Figwort—(*Scrofulária aquática.*)

In similar situations, but not quite so common. Abundant about Ashley, on the banks of the Bollin. Fl. July, August.

Curtis, ii. 336; E. B. xii. 854.

21. Foxglove—(*Digitális purpúrea.*)

Everywere south, west, and east of Manchester. On the banks of the railway between Hazle Grove and Disley, especially near a bridge about a mile before coming to Disley, this fine plant might, in 1858, have been reaped like a cornfield. Fl. June, July. Biennial.

Curtis, i. 48; E. B. xix. 1297; Baxter, ii. 113.

The foxglove is the most stately of English wild-flowers, imparting, like the poppy, a gay hilarity to every scene of its production. The corollas bulge out upon the under side, and on the inner surface are at this part hairy, and elegantly sprinkled with little spots like eyes. These freckled caverns are often large enough to admit the end of the finger.

22. Yellow Toad-flax—(*Linária vulgáris.*)

Dry hedgebanks, but rather local. Most frequent in the district extending from Bowdon towards the London and North-Western Railway. Abundant near Rostherne, and at Alderley. Fl. June—August.

Curtis. i. 47; E. B. x. 658 (both as *Antirrhinum Linária*).

A formal and stiff but pretty plant, easily recognised by its upright stems, thickly clothed with narrow lanceolate glaucous leaves, and long spikes of bright-yellow flowers of the form called "personate" or mouth-like, the upper lip deeply stained with orange. A very curious variety occurs sometimes, in which the corolla assumes the regular pentamerous figure, having five spurs which spread from the base like the rays of a star. Mr. Hunt finds it not uncommonly about Baguley. This variety is generally distinguished under the name *Peloria*, and excellently pictured in Curtis, ii. 495, and in E. B. iv. 260.

23. Arrow-leaved Toad-flax—(*Linária Elátine.*)

Cornfields, rare. Near Eccles (1856); and as a weed in gardens at Ashton-under-Lyne in 1857. Fl. June, July. Annual.

Curtis, i. 46; E. B. x. 692 (both as *Antirrhinum Elatine*).

24. Ivy-leaved Toad-flax—(*Linária Cymbalária.*)

Walls at Ashley Hall and Hough-End Hall; also at Bramhall, and Bank Hall, Heaton Mersey, abundant. (Mr. Isaac Williamson.) Fl. May, June.

Curtis, i. 45; E. B. vii. 502 (both as *Antirrhinum Cymbalaria*); Baxter, i. 23.

This pretty little trailer is a native of Italy, and was introduced undesignedly to this country by means of seeds mixed with hay that protected some marble sculptures sent to Oxford. It has naturalized itself in many parts, and is one of the neatest ornaments that can be selected for a wall or rockery.

25. Limosella—(*Limosélla aquática.*)

On the borders of Mere Mere. Fl. summer. Annual.

Curtis, iii. 506; E. B. v. 357; Baxter, iii. 212.

26. Great Torch-mullein—(*Verbáscum Thápsus.*)

On dry hedgebanks, rare. Occasionally at Stockport, Monton, Baguley, Chorlton, Bowdon, &c., but being a limestone plant, seldom in perfection, and here only as a wanderer. Finest on the banks of the railway near Disley. Fl. July, August. Biennial.

E. B. viii. 549 (but incorrect as to the hairs of the stamens).

An exceedingly noble plant. It is occasionally seen in gardens, and in the limestone counties grows on walls.

27. Moth-mullein—(*Verbáscum Blattária.*)

Spontaneous in gardens at Whitefield, 1858. (J. P.) "Near Atherlow, Cheshire." (B. G.) Fl. July, August. Biennial.

E. B. vi. 393.

Mimulus lúteus or *Langsdorfii*, which, like the stramonium and other foreigners, finds our English soil congenial, is fast assimilating itself with the aborigines in many places, and has selected, among others, the banks of the Goyt in Marple Valley. Thrown or astray from a garden in the first place, and then carried along by the stream, it seems likely to take up a permanent place there, being already in three or four different spots. It is an elegant and interesting plant, and will be a great acquisition to the Flora of our stream-sides. The species of *Mimulus* are mostly thus disposed to colonization; even the common musk-plant, or *Mimulus moschatus*, springs up by waysides at Prestwich, where garden fragments and refuse have been scattered. (J. P.)

Rhinanthus major is reported "near Northen." (B. G.) It may be well for botanists to look there for the *R. angustifólius*. (E. B., Supp. ii. 2737.)

The beauty of the flowers of this family gives it an important place in the garden. *Veronicas* of many species are among the earliest, accompanied indoors by the charming *Calceolárias*, with large panicles of pocket-shaped blossoms, tinted and speckled with almost every colour except blue. Summer brings many kinds of *Linaria*, and that remarkable flower, the snapdragon, or *Antirrhinum majus*, (E. B. ii. 129.) along with the white foxglove, the yellow *Celsias*, different species of *Mimulus* or monkey-flower, and *Chelones*, with panicles of scarlet. Most of these, along with the *Penstemons*, which have a fifth but antherless stamen, last onwards through the autumn, and some to the very close of the season. The half-hardy annuals likewise contribute much to garden ornament, especially those of the genera *Schizanthus* and *Collinsia*. One of the most striking plants of the family is the *Hemimeris* or *Alonzoa*, the corollas of which are vermilion and black. The species of *Mimulus* are remarkable for having the stigma composed of two plates or thin lips, which stand apart until touched, when they rapidly draw together. The common musk-plant is the *Mimulus moschatus*. None of the family, though there are so many in cultivation, are grown for purposes of domestic economy.

LXXV.—THE GLOXINIA FAMILY. *Gesneráceæ.*

The plants of this family are in England almost entirely for the hothouse, which they greatly adorn with their brilliant and plentiful blossoms. Nothing is finer to behold, in its season, than an *Achiménes longiflóra*, or an *Achiménes picta*, the former deep purplish-blue, the latter scarlet and orange. They are natives of the tropical parts of

America, of the warm valleys of the Himalayahs, and of the islands of the Indian Archipelago, one or two species only inhabiting Europe. One of these, the *Ramónda Pyrenáica*, is occasionally seen in choice collections of alpines. At the first glance, many of the family might be taken for allies of the foxglove, the corollas being highly suggestive of that noble flower, and the leaves rough and crumpled; and it must be confessed, that except for some peculiarities in the ovary and the seed, they might be not inappropriately classed together. In the Gesneraceæ the placenta is axile, and the cotyledons are comparatively minute; in the Foxglove Family the placenta is parietal, and the

Fig. 152.
Flower of Gloxinia.

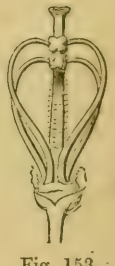


Fig. 153.
Stamens and Pistil of Gloxinia.

cotyledons of the usual proportion as to size. In the Gesneraceæ there is also a strong tendency to form epigynous flowers, which in the Foxglove Family is never seen. The Gesneraceæ are mostly herbaceous, and often rise only a few inches above the ground, whereby the large size of their flowers is made more remarkable, as in the case of the Gloxinias, which have the habit somewhat of primroses. They are often succulent; their leaves are simple, rough, and exstipulate; the corolla is tubular, pentamerous, and more or less irregular; the stamens two or four, in the latter case didynamous; the ovary solitary and large. A common occurrence among them, and ready charac-

teristic, as well as distinguishing feature, when they are compared with the Foxglove Family, is the *cohesion of the anthers*, which lock themselves together, and resemble four tightly-clasped hands. They hold so firmly as to require the knife before they will separate. The filaments being long, and in two pairs of unequal length, are curved into an elegant double arch, of which the combined anthers form the keystone. (Fig. 153.) Sometimes there are five stamens. The other genera in our hot-houses include *Cyrtándra*, *Streptocárpus*, *Gesnera*, *Trevirana*, and *Æschynanthus*. The *Æ. albida* is a remarkably handsome plant, having clusters of large crimson blossoms at the extremities of the pendulous branches, from which they bend upwards like Turkish hookahs.

LXXVI.—THE PRIMROSE FAMILY. *Primulàceæ.*

Herbaceous plants, seldom more than twelve inches high. Leaves simple, oval, or lanceolate (when under water pinnatifid), often in radical tufts, otherwise opposite, whorled, or alternate, and either serrate or entire. Flowers in umbels, on radical scapes; or solitary or racemose in the axils of the leaves. Sepals five, combined for nearly their whole length; petals five, uniform, usually combined for half their length, the upper portion spreading horizontally, or even reflexed; stamens five, opposite the petals or corolla-lobes, and attached to them; pistil one; stigma simple and capitate; ovary one-celled; fruit a many-seeded capsule, with a free central placenta, which is often thick and globular. In *Centúnculus* the flowers are tetramerous; in *Trientalis* there are seven stamens; and in *Glaux* the corolla is absent. The emphatic distinction between the Primulaceæ and the other families that have regular flowers, with the petals combined, and the stamens seated on the corolla, consists in these parts being *opposite* the petals or corolla-lobes; the stamens of the Phlox Family, the Gentian Family, &c., being *alternate* with them. The character requires some care in observation, especially where the petals are scarcely united, and the stamens upright in the centre of the flower, as in the genus *Lysimachia*.

The pretty and varied plants which constitute the Primrose Family are plentiful in the northern and colder parts of the globe, growing in woods, meadows, pastures, by river and stream-sides, and on mountains, even to the snow-line. Their bright, unassuming, and

often fragrant flowers are among the earliest harbingers of spring, and none are so generally known and admired. The primrose and cowslip in the fields, the polyanthus and auricula in the garden, never

Fig. 154.
Primrose.

wear out their welcome or the florist's interest. With the exception of cowslip wine, things of "utility" are, however, not supplied by them.

About two hundred species are known, seventeen growing wild in England, and nine in the neighbourhood of Manchester.

A.—Growing submerged in water. Leaves pectinate; stem erect, solitary, leafless, eight to twelve inches high; flowers pale purple, in whorls of three to six, forming a terminal raceme ..... 1. Water Featherfoil.

B.—Growing on land. Leaves undivided.

- Flowers tetramerous; stems one to two inches high; leaves ovate; flowers minute, pink, sessile, solitary ..... 2. Chaffweed.
- Parts of the flower in fives.
  - *a.* Flowers axillary & solitary. Stems more or less trailing. Leaves opposite and entire.
    - Flowers scarlet, pink, or white.
      - Leaves oblong, sessile, pointed; stems six to twelve inches long; flowers usually scarlet ..... 3. Scarlet Pimpernel.
      - Leaves round, on stalks; stems two to four inches long; flowers pinkish and striped ..... 4. Bog Pimpernel.
    - Flowers bright yellow. Leaves ovate.
      - Calyx-segments ovate; peduncles shorter than the leaves; stems one to two feet long ..... 7. Trailing Loosestrife.
      - Calyx-segments linear; peduncles longer than the leaves; stems six to twelve inches long ..... 6. Little Sylvan Loosestrife.
  - *b.* Flowers in large terminal leafy panicles; stems two to three feet high; leaves ovate-lanceolate, pointed, in whorls of three to five ..... 5. Great Pyramidal Loosestrife.
  - *c.* Flowers solitary, radical, on peduncles as long as the leaves, which are puckered, oblong-ovate, obtuse, and gradually taper into petioles. Limb of the corolla five-lobed, the lobes flat and notched. (Fig. 154)..... 8. Primrose.
  - *d.* Flowers in umbels, on radical scapes; leaves oblong-ovate and puckered, as in the primrose, but abruptly contracted in the middle. Limb of the corolla concave..... 9. Cowslip.

THE PRIMROSE FAMILY.

HABITATS AND LOCALITIES.

1. Water Featherfoil—(*Hottónia palústris.*)

Sparingly in a pond near Besses-o'th'-Barn, the same where the great spearwort grows; and abundant in a pond that comes up close to the side of the by-road from Middleton to Tandle Hill, about half way along, on the right hand side. Abundant also in a pond on the left hand side of the lane leading from the "Waggon and Horses" at Moston, to the "Duke of York," Newton Heath, not very far from Boggart-hole Clough, and flowering plentifully, 23rd May, 1859. (Mr. Hillerman) It blooms prettily also in the ornamental water at the Botanic Gardens, having been casually introduced with some other aquatic.

Curtis, i. 11; E. B. vi. 364; Baxter, vi. 421.

One of the prettiest water-plants this country produces, and an excellent kind for the aquarium, where the light-green and finely pectinated leaves shew themselves to perfection. In the full-grown state, or when the plant is in blossom, they resemble the bones of a fish, such as the sole, consisting of a central stalk, and numerous parallel divisions on either side.

2. Chaffweed—(*Centúnculus minimus.*)

Dry moors. Lindow Common, plentiful; Amberswood Common, between Hindley and Wigan; Hale Moss, sparingly. Fl. June, July. Annual.

E. B. viii. 531; Baxter, iv. 296.

The chaffweed and the elatine (p. 155) are the two smallest of the British flowering plants.

3. Scarlet Pimpernel—(*Anagállis arvénsis.*)

Dry fields, and by waysides, common. Fl. June—September. Annual.

Curtis, i. 12; E. B. viii. 529 (colour gone); Baxter, i. 29.

At the base of each petal is a purple velvety spot, adding greatly to the brilliancy of this rich little flower, varieties of which occur of a salmon-colour, pale

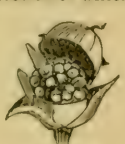


Fig. 155.
Capsule of Pimpernel.

flesh-colour, pure white, and gentianella blue, but all very sparingly. The blue variety is by some esteemed a species, and called *Anagállis cærúlea.* (Curtis, iv.

592.) The hairs upon the stamens are formed of a string of globular cells, gradually diminishing in size towards the extremity, and resembling the beads of a necklace. The structure of the capsule is exceedingly curious. It is perfectly spherical, and when ripe separates horizontally into two pieces, the upper falling off like a lid, so as to allow of the escape of the seeds. (Fig. 155.) During its progress to maturity the peduncles curve themselves downwards, and invert the cup thus uncovered. The sensitiveness of the blossoms to atmospheric changes is well known, and celebrated in the rustic name of "Shepherds' weather-glass."

4. Bog Pimpernel—(*Anagállis tenélla.*)

Heaths and moors, rather uncommon. Baguley; Hale Moss, plentiful; Milnrow, near Oldham (J. P.); by a spring oozing on to the roadside at Siddington, near Congleton. (Mr. Holland.)

Curtis, i. 160; E. B. viii. 530.

The capsule and the hairs upon the stamens resemble those of the preceding species, and form part of the characteristics of the genus. Here, however, the hairs are so numerous as to render the filaments quite woolly.

5. Great Pyramidal Loosestrife—(*Lysimáchia vulgáris.*)

Banks of rivers, and similar places of moisture, rather uncommon. Wooded banks of the Mersey at Stockport. Canal-bank at Dunham. Haughton Dale, on the banks of the Tame. Botany-Bay Wood and Vicar's Hall, Worsley. (J. E.) Old pitsteads on Chat Moss. (J. S.) Borders of Mere Mere, and of Rostherne Mere, abundant. Fl. July.

Curtis, ii. 311; E. B. xi. 761.

Very common in gardens, especially suburban ones, where its tall, solid pyramids of yellow flowers grin through the iron railings, and bid defiance to the smoke.

6. Little Sylvan Loosestrife—(*Lysimáchia némorum.*)

Woods and damp shady places, abundant everywhere, loving the sides of little ravines in cloughs, where water oozes. Boggart-hole Clough; Agecroft Clough; Mere Clough. Fl. May—September.

Curtis, ii. 310; E. B. viii. 527; Baxter, iv. 310.

The peduncles curve downwards after flowering, like those of the scarlet pimpernel.

7. Trailing Loosestrife—(*Lysimáchia nummulária.*)

Shady and grassy ditch-banks, where its slender stems can trail and hang in wreaths, are the favourite abiding-place of this elegant plant, the blossoms of which are the largest of the native species. Borders of Rostherne Mere; in the ditches by the path leading through the fields from Dunham Park to Bollington; Tyldesley and Eccles, in

many places (J. E.); farther part of Chat Moss (J. S.); Bedford and Astley, not infrequent. (R. H.) Fl. June—August.

Curtis, i. 159; E. B. viii. 528.

Like the great pyramidal loosestrife, a contented but less frequent, and seldomer-blossoming inmate of town-gardens.

8. PRIMROSE—(*Primula vulgáris.*)

Woods and hedgebanks. Plentiful about Cheadle; plentiful about Lymm, especially in Thelwall Rough; between Ashton-upon-Mersey and Partington, in meadows near the river; at Alderley, under the Edge; and innumerable in the Valley of the Bollin, near Cotterill Clough, concerning which locality see "Walks and Wild Flowers," p. 32. Fl. April, May.

Curtis, ii. 380; E. B. i. 4.

Common in gardens, with many varieties, chiefly double, yellow, lilac, crimson, and polyanthus-like, and occasionally with the flowers umbellate, as they are, in fact, in the fields, only that there the scape is usually undeveloped. By careful dissection, the umbel may be taken out entire. The flowers vary, even in the fields, to white, and when the plant grows upon clay, to a dull red.

9. COWSLIP—(*Primula veris.*)

Meadows and pastures, but not common. Fields between Bowdon and Cotterill, and near Rostherne. Abundant in a field on the Manchester side of the Mersey, a little above Northen. (Mr. Knight.) Fields at Lymm and Warburton, and fields between Reddish and Stockport. Near the bottom of Burnage Lane, on the red clay. Middle Hulton. (R. H.) Plentiful in Worsley and Tyldesley (J. E.), and formerly so at Hope, but now scarce. (J. S.) Fl. May.

Curtis, ii. 379 (as *P. officinalis*); E. B. i. 5; Baxter, ii. 89.

Common in gardens, both in its original form and in its lovely progeny, the innumerable varieties of polyanthus. Many varieties also occur which cannot be legitimately called by either name, having the form, though more luxuriantly, of the pasture cowslip, with the colour, incipiently, of the polyanthus. The most curious varieties are those in which the calyx is partly or wholly changed into corolla. In one, tolerably common, and often called "King Charles," the calyx is half green and half crimson; in another, a very old-fashioned plant, called "hose-in-hose," the calyx is an exact duplicate of the corolla; and in a third it is formed of five distinct leaves, miniatures in every point of the ordinary foliage of the plant, and excellently illustrating the physiological principle, that all the parts of flowers are resolvable into the LEAF, as their common type. The grandest elucidation of modern Botany is, that the leaf, the sepal, the petal, the stamen, and the carpel, are so many different modifications of a single organic base, impressed with different forms, and endued with different functions, but essentially the same, and under certain circumstances exchangeable one for the other. (See "Life, its Nature, Varieties, and Phenomena," p. 330. Ed. 2.)

Whether these two plants, the primrose and the cowslip, be really distinct, is by many botanists doubted, and some do not hesitate to call them the same. For my own part I believe them genuine species. Specific distinctiveness is not a matter wholly of shape. It includes the whole nature of a plant, its habits, tendencies, and capacities, and every circumstance connected with its life and position in the economy of the world. The primrose loves shade, growing on sheltered banks and in sylvan retreats, and blooms with the wood-anemone, or just as the latter is on the wane. The cowslip, on the other hand, seldom or never seeks the protection of trees, but courts the sunshine in the open fields, blossoming, in its wild state, when the primrose is past its prime, and keeping company with the meadow orchis, which rarely opens till the anemones are all gone.

In the field behind Castle Mill, near the entrance to Cotterill Clough, I have gathered the plant figured in Curtis, iii. 458, and E. B. viii. 513, as the "oxlip," or *Primula elátior*, and commonly called by that name in the cowslip districts, where it is common (as about Congleton and Bristol), as well as in old-fashioned gardens. It resembles the cowslip in its umbellate inflorescence, but the limb of the corolla is nearly flat, the stalk is stouter and taller, the flowers are of proportionately greater size, and half-erect, like those of the garden polyanthus, of which it is probably one of the intermediate or proximate sources. Pale-flowered varieties remind us of the umbellated primrose. This plant, however, is quite a different thing from the genuine oxlip. It is not even a *species*, for the seeds produce along with oxlips resembling the parent plant, cowslips also, and even primroses. This plainly proves it to be a mule or hybrid between those two plants, the result of the bees and other insects carrying the pollen from the stamens of one kind of flower, and depositing it upon the stigma of the other, as they continually do with cucumbers and melons, much to the gardener's annoyance. The true oxlip is an exceedingly rare plant, and was only determined to be a native of this country about fifteen years ago, when Mr. Doubleday, of Epping, discriminated it as the "Bardfield oxlip," by which name it is now known among botanists. It blossoms a month earlier than the hybrid commonly called the oxlip; its flowers *droop* instead of standing nearly erect, and it reproduces itself unaltered, and without any intermixture of primroses and cowslips among its progeny. This, at least, is the experience of Mr. Sidebotham, who has cultivated and carefully watched the plant since 1844. Botanists misled into the belief of the hybrid or common oxlip being the genuine *Primula elatior*, and finding it produce primroses and cowslips when the seed was sown, have naturally inferred that all three plants are but one, the oxlip being the bridge that unites the two extremes. But this is quite an uncalled-for notion. There are three genuine species, the cowslip or *Primula veris*, the primrose or *Primula vulgaris*, and the oxlip or *Primula elatior;* and in addition to these, there is the hybrid plant, erroneously called *P. elatior*, and which belongs to the Manchester Flora, though the true oxlip does *not*. The hybrid plant has been found also at Gatley, Prestwich, Levenshulme, and other places.

The Primulaceæ in cultivation are numerous, the polyanthus, the primrose, and the cowslip standing forth simply as their popular representatives. The

first and third of these ring the changes only on red and gold, but the primrose varies to lilac and other tints, and in the double state scarcely seems to have come from the pale flower it was in the fields. The best polyanthuses are considered to be those which, in conjunction with an exceedingly rich and deep colour in the body of the petals, have them edged with a broad and even line of yellow, and the mouth of the tube closed by the anthers. It is considered a great ornament when the mouth has a kind of raised border surrounding it, and a great blemish if the stigma appears instead of the anthers, florists having their fancies, like all other folks. Equally beautiful with the polyanthus is the auricula, distinguished by the shortness of its calyx, and the whole plant being more or less whitened with a mealy powder. The leaves also are smooth and leathery, instead of puckered. The exquisite velvety surface, and deep royal purple, crimson, claret, and copper-colour of the auricula, are almost unequalled among flowers. Long before these open in the garden, there is the lovely Chinese primrose, or *Primula Sinensis*, with a large umbel of lilac or white flowers, double in some varieties, elegantly fringed at the edge in others, and the most curious calyx in nature, being broad and distended at the base, and gradually narrowed upwards. Several other Primulas are met with now and then, as the *P. cortusoides* and the *P. farinósa*, (E. B. i. 6.) a native of our subalpine pastures. Summer brings different kinds of pimpernel or *Anagallis*, with flowers of brilliant blue; *Lysimachias*, with yellow blossoms; and the sweet little *Androsáce*, but this last is very rare. Some of the genera have their petals reflexed, or bent back from the rim of the tube towards the peduncle. This is the case in the *Cyclamen*, two or three species of which are inmates of choice green-houses, and with the "Virginian cowslip" or *Dodecatheon*, hardy and tolerably common. The latter bears an umbel of lilac blossoms on the summit of a leafless stalk twelve inches high, the flowers on long peduncles, and elegantly pendulous, and resembling a lady's half-opened silken parasol, the anthers projecting at the extremity in an elongated golden point.

LXXVII.—THE VERBENA FAMILY. *Verbenáceæ.*

The Verbenaceæ are mostly trees or shrubs, herbaceous plants being quite in the minority. They belong to the tropics of both hemispheres, and to the temperate parts of South America, and have a few scattered representatives in Europe, including the solitary British species, called vervain, or *Verbéna officinális*. (E. B. xi. 767.) Near Manchester we have only those beautiful exotics, the scarlet and purple verbenas of the autumn, and a few green-house shrubs. The best known of the latter is the fragrant-leaved verbena, or *Aloysia citriodora*, often called the "lemon-tree," from the resemblance of the odour of its foliage to that of ripe lemons. The others comprise species of *Lantána* and *Clerodéndron*. The Lantanas are remarkably pretty, though of rather a sprawling habit, with somewhat prickly

stems, and the odour of lucifer-matches. These drawbacks are more than compensated by the delicate hue of the blossoms, which are either lilac and primrose intermingled in the same cluster, as in the *Lantana mutabilis*, or of a fine rich orange colour, as in the *crocea*. The flowers are borne in little umbels an inch and a half across.

The affinities of the family are closest with the Labiatæ, and their properties are much the same, but they are not of importance in a medicinal or economic point of view, being deficient in those reservoirs of oil upon the leaves which render the plants of the family in question so remarkable. The leaves are generally opposite and simple; the inflorescence is various; the corolla usually irregular, though not mouth-shaped; the stamens and pistil as in the Labiates, except that the style proceeds from the summit of the ovary instead of from the base, and that the ovary is not divided into four. The gay, hardy autumnal flower is the *Verbena melindres* or *V. chamædrifolia*, and is a native of the neighbourhood of Buenos Ayres. *Verbena venosa* and several other species of similar habit are sparingly in cultivation.

LXXVIII—THE PHLOX FAMILY. *Polemoniaceæ.*

Pretty little herbaceous plants, except in the instance of the *Cobæa*, which climbs to the height of many yards. Leaves usually opposite and simple, sometimes so deeply pinnatifid as to seem pinnate. Flowers regular, pentamerous, the petals usually united into a tube at the lower part, and concealing the stamens, which correspond in number with the petals, and are alternate with them. Style one; stigmas *three;* ovary *three-celled.* This last character is eminently characteristic, distinguishing the family from all other exogens that have the stamens inserted on the corolla, and especially from the primrose and cowslip kind, which the blossoms a good deal resemble in general structure, but in which the ovary is only one-celled. The flowers are usually borne in panicles, and in different species, are of every colour except yellow. The pollen is often blue, whatever be the colour of the corolla. Pollen of this tint is not uncommon where the *flowers* are blue, but it is remarkable to find it blue where they are of any *different* tint. The seeds are usually numerous, and remarkable, in several instances, for having their outer skin or "testa" provided with an infinite number of exceedingly delicate and minute spiral threads, which lie coiled up, spire within spire, on the outer surface.

Immediately they are put in water, the mucus in which they are embedded softens and dissolves, and the spirals dart out in a perfect cloud, enveloping the seed in ringlets. Of course it is only under the microscope that this truly beautiful phenomenon can be witnessed. The seed of the *Collomia* (purchaseable at any seed-shop) is the best for examination. A small bit of the testa should be cut off, and laid in a drop of water, with the surface uppermost.

The temperate parts of America are the chief abodes of the family; they are unknown in the tropics, and a few only inhabit Asia and Europe. One species, widely diffused over the higher latitudes of the whole of the northern hemisphere, is found wild in England, and occurs on the verge of the Manchester Flora, viz., the Jacob's ladder, or Greek valerian, the latter name singularly inappropriate, as it has nothing whatever in common with the true valerians. The Jacob's ladder is an elegant perennial, with leaves formed of ten to twenty lanceolate and entire segments resembling leaflets, arranged in pairs on a stalk eight inches or more in length, and growing in dense radical tufts of a light and tender green. The stem is erect, angular, panicled, twelve or eighteen inches high, with a few leaves resembling the others, only smaller, and a shewy terminal corymb of blue or white flowers. The petals are broad, round, and but slightly united.

HABITATS AND LOCALITIES.

JACOB'S LADDER—(*Polemónium cærúleum.*)

Abundant in fields and by hedgerows near the Buxton Road, beyond Whaley Bridge. Fl. June, July.

E. B. i. 14; Baxter, ii. 149.

Very common in gardens, especially old-fashioned ones.

Few families of such limited extent supply our gardens with so many pretty flowers. The forty or fifty species of *Phlox*, beginning in the spring, and lasting till the very end of the autumn; the delicate and shewy annuals called *Gilia tricolor* and *Leptósiphon densiflórus*, with several others of the same genera, the *Collómias*, the *Ipomópsis*, and the *Cobœa scandens*, are members of this uniformly pleasing race. A large proportion of them are from California, and other parts of North America in the same latitude.

LXXIX.—THE NEMOPHILA FAMILY. *Hydrophyllàceæ.*

The Hydrophyllaceæ, as known in England, are pretty little annuals of the flower-garden, including the blue *Nemóphila insignis*, the white *Nemóphila atomária*, the *Eutóca viscida*, and the elegant genus

Phacélia. Abroad they are in many cases shrubby and arborescent. Their affinities are with the Borage Family, in their frequently rough leaves, and the incurved racemes of flowers seen in *Phacelia;* with the Phlox Family in general aspect; and with the Primrose Family in regard to the placenta. Though somewhat heterogeneous as a whole, they are easily distinguished, however, from the Borage Family, by their one-celled ovary; from the Phlox Family, in the same way; and from the Primrose Family, by their stamens being alternate with the petals, those of the Primulaceæ being *opposite* to them. There are not a hundred species altogether, and few are found out of America. None appear to possess qualities of importance.

LXXX.—THE THRIFT FAMILY. *Plumbagináceæ.*

Pretty herbaceous or undershrubby plants, very unlike one another in foliage, inflorescence, and general figure, but at once distinguished from all other families where the petals are united, by their plaited calyx and solitary ovule, the latter suspended from the apex of a cord arising from the base of a one-celled ovary, which is crowned with *five* styles, either quite distinct, or united below the middle. When more than one style is present in a flower, we naturally anticipate more than one cell to the ovary; here, however, it is just the contrary. Stems usually hard and stiff; leaves simple, undivided, and entire, sometimes clustered, sometimes alternate; inflorescence either in panicles or globular heads; calyx tubular, plaited, persistent, sometimes coloured and enlarged, and petal-like at the upper part; corolla of five remarkably thin petals, which are either free or united, in which latter case the tube is narrow and angular. Stamens five, opposite the petals; perigynous when they are free, hypogynous when combined.

The greater portion of these plants are natives of the sea-coasts and adjacent salt-marshes of the temperate parts of the world, especially of the basin of the Mediterranean. The remainder grow in mountainous places inland, the family, as a whole, reaching from Greenland to Cape Horn. The properties are various, and in some cases medicinal, and many species are highly prized by gardeners. About one hundred and sixty are known, six or seven of them growing wild on the coasts of Britain, where they are popularly called "sea-lavender" and "sea-pink." The former are species of *Státice;* the sea-pink is

the *Armèria vulgàris*. (E. B. iv. 226.) This charming little plant, which often gives a roseate tinge to pastures that slope towards the water-side, as on the southern shores of the Bristol Channel, though it best loves the ocean breeze, grows equally well when remote from it. The neat, dense, cushion-like mode of its growth, adapts it excellently for the edgings of flower-borders, to which purpose, under the name of "thrift," it is frequently applied in Manchester gardens, innumerable flowers decking them prettily in early summer. The leaves are numerous, radical, linear, an inch or two long, evergreen, though winter sometimes treats them ungraciously; the flower-stalks simple and leafless, three to eight inches high, with a globular head of pink or sometimes white blossoms, intermingled with which are numerous chaffy scales, the outer ones forming a kind of basket or "involucrum," and the two outermost prolonged downwards into a sheath that surrounds the stalk. The styles are hairy at the base.

Several species of *Statice*, with panicles of lilac flowers, are grown in green-houses, along with some tall and elegant half-shrubby plants called *Plumbágo*.

LXXXI.—THE RIB-WORT FAMILY. *Plantagíneæ*.

A family of about one hundred and twenty little herbaceous plants, usually stemless; the leaves oval, lanceolate, or pinnatifid, and growing either in upright tufts, or in flat rosettes a few inches in diameter, and lying close upon the surface of the ground. When oval or lanceolate, the leaves are provided with strong ribs. (Fig. 43.) Flower-stalks radical, leafless, bearing at the summit a dense and oval, or long and cylindrical spike of minute blossoms, the parts of which are in fours, and generally dry and chaffy. Stamens four, with long and flaccid filaments; anthers large and conspicuous. Fruit a tiny capsule, opening transversely like that of the pimpernel (p. 266). In certain exotic species of *Plantágo* the stem is developed, and becomes branched and leafy; and in the *Littorella* the flowers are unisexual, or nearly so, and instead of growing in spikes, are solitary and terminal.

Plantagineæ are found all over the world, but chiefly in temperate countries, growing in dry and waste places, in meadows and pastures, and by the sea-side, often close to high-water mark. Their foliage is slightly bitter and astringent. Six species occur in England, and all but one of them grow near Manchester.

A.—*Flowers unisexual and solitary.* Leaves narrow-linear, one to three inches long, and bright green. Peduncles of the male flowers two or three inches high, with the blossom at the apex; the stamens, which form the most conspicuous part of it, full half an inch long; the anthers large and ovate. Female flowers concealed among the foliage ..... 1. LITTORELLA.

B.—Flowers bisexual; clustered into spikes.

- Leaves pinnatifid, with linear and cut segments, more or less hairy, and perfectly flat on the ground, resembling a little star with the rays branched. Spikes cylindrical, one to three inches long, resembling small ears of wheat ..... 2. BUCK'S-HORN.
- Leaves undivided, and strongly ribbed.
  - Anthers purple; filaments short; spike several inches long, quill-shaped; leaves oval, often many inches long, petiolate, and seven-ribbed ..... 3. GREAT RIB-WORT.
  - Anthers white; filaments long; spike short and oblong.
    - Flower-stalk cylindrical; leaves oval, sessile, gray-green, flat on the ground; flowers silvery; filaments pale purple ..... 4. WHITE RIB-WORT.
    - Flower-stalk angular, furrowed; leaves lanceolate, petiolate, five-ribbed, nearly erect; flowers brown; filaments white .. 5. MEADOW RIB-WORT.

THE RIB-WORT FAMILY.

HABITATS AND LOCALITIES.

1. Littorella—(*Littorélla lacústris.*)

Pondsides on Lindow Common. Margin of Mere Mere, plentiful; and by ponds at Baguley, on the site of the extinguished moor. Fl. June, July.

Curtis, iv. 642; E. B. vii. 468; Baxter, iv. 284.

Probably occurs in the mud and wet sand on the borders of many other Cheshire pools, but unobserved, as it is prone to remain under water, without flowering. The leaves then become longer and grass-like.

2. Buck's-horn—(*Plantágo Corónopus.*)

Dry, sandy places, rare. Knutsford Race-ground, abundant. Formerly in abundance on Kersal Moor, and near Hale Moss, but the spade and plough have been too strong for it. Fl. May—August. Annual.

E. B. xiii. 892.

Often called "Star of the Earth," from the beautiful stellate figure of the foliage as it lies close upon the surface.

3. Great Rib-wort—(*Plantágo major.*)

By waysides, and on heaps of roadside rubbish, common everywhere. Fl. July—October.

Curtis, i. 83; E. B. xxii. 1558; Baxter, iii. 207.

In gardens there is sometimes grown an extraordinary variety, in which, instead of a spike of flowers, there is a rose-like tuft of green leaves.

4. White Rib-wort—(*Plantágo média.*)

Dry fields and waysides, a plant of the limestone districts, which it greatly ornaments, and in these parts only astray. Near Seaman's Moss Bridge, on the bank of the canal. In the grounds at Worsley Hall. (J. E.) Common near Congleton. Formerly near Bowdon old Church, by the roadside, but now shaved away. Fl. July.

Curtis, ii. 231; E. B. xxii. 1559.

5. Meadow Rib-wort—(*Plantágo lanceolàta.*)

In meadows and pastures, profusely everywhere, and often a principal element of the hay-field. Fl. June, July.

Curtis, i. 82; E. B. viii. 507.

No plant of the meadows is more conspicuous; for though the flowers are minute, the large white anthers make it visible from a long distance. The lowermost blossoms open first, and the upper ones gradually afterwards, surrounding the spike with a zone of white, which mounts by degrees from the bottom to the top. It is sometimes found with three or four heads clustered together.

LXXXII.—THE BUTTERWORT FAMILY. *Lentibulariáceæ.*

A family of about one hundred and seventy very pretty little herbaceous plants, living either on wet moors in mountainous regions, or in marshes and ponds, and dispersed all over the world. Leaves, in the land species, simple and radical; in the aquatic kinds, finely divided, so as to resemble roots, and thickly hung with minute air-bladders. Flowers, in the land species, solitary; in the aquatic species, racemose, and always very irregular. Corolla two-lipped, projecting at the base into a spur. Stamens usually two; stigma two-lipped; ovary single; capsule one-celled, with many seeds attached to a central placenta, in which respect these plants resemble the Primulaceæ, while the irregular and spurred flowers, and several other points of structure, indicate an affinity with the Foxglove Family.

Seven species are described as British, though two are probably fanciful. Three of the undoubted ones grow near Manchester.

1. Leaves oval, one or two inches long, entire, radical, spreading, the margins rolled inwards, light-green, somewhat succulent, and covered with little crystalline points, which give them a wet and clammy appearance. Flower-stalks radical, leafless, three to five inches high, bearing a solitary, handsome, blueish-purple, and drooping flower, not unlike a purple violet, the palate covered with white hairs ..... COMMON BUTTERWORT.

2. Plant floating in water, with long, fibrous, root-like branches and leaves, all submerged, and hung with little green bladders full of air. Flowers in a terminal raceme, on a leafless stem which rises eight or ten inches out of the water. Corolla rich yellow, about half an inch long, the spur conical, and the lower lip broad and convex ..... COMMON BLADDERWORT.

3. Similar to the preceding, but smaller and more slender in all its parts, the floating portion often intricately branched. Flowers pale-yellow, with the lower lip much flattened, and the spur usually reduced to a short and broad protuberance SMALL BLADDERWORT.

HABITATS AND LOCALITIES.

1. Common Butterwort—(*Pinguícula vulgáris.*)

Boggy places on Fo-edge, and the hills, generally, beyond Bury, Rochdale, and Stalybridge. Plentiful between Hayfield and Kinder Scout, and on the heights above Lyme Park. Abundant also and very luxuriant between Buxton and Bakewell, the best locality in England. (Mr. Leigh.) Fl. June, July.

Curtis, iii. 438; E. B. i. 70; Baxter, iii. 209.

2. Common Bladderwort—(*Utriculária vulgáris.*)

Ponds near Peel Green, Eccles, plentiful, and blossoming every year. (J. S.) The same in the Lime Pits, Bedford (J. E.); at Astley Moss, and at Whitehead Hall, Astley (R. H.); and the same in two or three pits on Damhead Farm, Mobberley, where it bloomed freely in 1857. (Mr. Holland.) Up till 1857 it also bloomed abundantly in Seaman's Moss Pits, near Timperley, but they have been drained, and the plant is destroyed. Fl. June, July.

E. B. iv. 253; Baxter, v. 349.

3. Small Bladderwort—(*Utriculária minor.*)

Ponds upon Hale Moss and in Victoria Park, but never flowering in either place. In a pit by Peel Green Bridge, Eccles, but not in flower; and in a pit near Astley, where it flowered sparingly in 1856. (J. S.) Lindow Common. "Carrington Moss." (B. G.) Formerly in a pit near Chaddock, where it bloomed freely, but now destroyed. (J. E.) Fl. June, July.

E. B. iv. 254.

The Utricularias make admirable Aquarium plants, alike in the beauty of their light-green and vesicular branches, and in the elegance of their flowers.

The *Myrsináceæ* are shrubs entirely extra-European, and having affinities with the Primrose Family, from which they are distinguished by their arborescent habit and fleshy fruit. The only interesting species in cultivation is the green-house plant called *Ardísia crenuláta*. Another little family of this group, called *Nolanáceæ*, and exclusively South American, is represented in a few disregarded annuals with campanulate blue flowers. A third, called *Selagináceæ*, exists among us in the green-house *Selagos*, and a very unusual hardy plant bearing the name of *Globularia*.

GROUP III.—PERIANTH ON THE SUMMIT OF THE OVARY.

LXXXIII.—THE MYRTLE FAMILY. *Myrtáceæ.*

One of the noblest groups known to botany, belonging to hot countries both within and without the torrid zone, and containing some of the largest and handsomest trees that adorn them. No species are of less stature than the common myrtle, the fragrant evergreen leaves of which, and pure white, hawthorn-like flowers, have made it a favourite in English green-houses for more than two centuries. This also is the most northern of them, being found wild in Persia, and now naturalized in the south of Europe. No family is more decidedly marked. Opposite and entire leaves, destitute of stipules, covered with minute transparent dots, and having a vein running parallel with the margin, are found almost universally; and in the few cases where the leaves are alternate, the marginal vein is still discoverable. The flowers are red, white, or occasionally yellow, but not in a single instance blue. The number of sepals and petals is variable, but the stamens are always numerous, and the ovary is always solitary and beneath the blossom, owing to the adhesion of the calyx to the outer surface. The clove and the allspice are products of this fine family, along with many delicious fruits never seen in England. It also contributes largely to the ornamentation of our conservatories, especially in the New Holland genera *Metrosideros*, *Beaufórtia*, and *Melaleuca*, and in the Indian *Eugénias*. None are seen out of doors in this part of the country.

LXXXIV.—THE FUCHSIA FAMILY. *Onagráceæ.*

Herbaceous and shrubby plants, natives chiefly of the temperate parts of the world, and especially of North America and Europe; for the most part gay and ornamental, but of little discovered use economically. Leaves alternate or opposite, simple, rarely divided, usually lanceolate or ovate, and serrate. Flowers regular, tetramerous; stamens eight; pistil solitary, with a four or two-lobed ovary; stigmas often four, and in that case elegantly recurved. The pollen is triangular, and often hangs together by threads. There is a tendency in this family to suppress the petals, and in some genera, such as the fuchsia, to assume a petaloid character in the sepals. In

Circæa the sepals, petals, and stamens are reduced to two each. Few families offer readier or prettier examples of the adhesion of the calyx to the exterior surface of the ovary, whereby the flower is lifted, in effect, on to the summit of that organ. This is remarkably conspicuous in the fuchsia. There are about thirty known genera, and upwards of four hundred and fifty species. Thirteen grow wild, or as colonists, in Great Britain, eight of them being found wild near Manchester, and six of the eight belonging to the pretty genus *Epilobium*. The latter are immediately distinguished from all our other wild-flowers by their lanceolate and serrate leaves, four-petaled pink or lilac blossoms,

Fig. 156.
Enchanters'-wort.

seated on the summit of a long and slender ovary, which looks like a peduncle. When ripe, the capsule opens from the top downwards into four long and narrow valves, curling outwards, and liberating numerous little white-winged seeds, that hang about it for some time. The two *Circæas* are equally well-marked by their elegant little racemes of pinkish-white flowers, the peduncles horizontal while the plant is in bloom, but subsequently bent downwards, and tipped with a roundish seed-pod, rough over its whole surface with hooked bristles.

- **A. — Stamens two; petals two; sepals two, reflexed. (Genus *Circæa*.)**
  - Stems nine to eighteen inches high. Leaves opposite, ovate-heart-shaped, toothed, wavy, or entire, and stalked. Plant more or less pubescent; capsule pear-shaped, two-celled, with a seed in each cell. (Fig. 156) ..... 1. Common Enchanters'-wort.
  - Stems six to eight inches high. Leaves as above, but perfectly glabrous. Capsule oblong, with one of the cells almost always abortive ..... 2. Alpine Enchanters'-wort.
- **B. — Stamens eight; petals four; sepals four. (Genus *Epilobium*.)**
  - Flowers in long, terminal, leafless racemes; corolla somewhat irregular; stamens bent down; pollen blue; ovary hoary, purplish underneath. Stems three to four feet high.. 3. Rosebay Willow-herb.
  - Flowers axillary, numerous; stamens erect.
    - Stigma deeply four-lobed, the lobes recurved.
      - Flowers fine crimson, nearly an inch across; stems three to four feet high..... 4. Great Crimson Willow-herb.
      - Flowers lilac, insignificant. Stems one to two feet high.
        - Leaves lanceolate, serratures few; stem cylindrical, softly hoary..... 5. Small-flowered Willow-herb.
        - Leaves ovate, sharply serrate; stem cylindrical, nearly glabrous ..... 6. Mountain Willow-herb.
    - Stigma club-shaped, undivided. Stems one to two feet high.
      - Stem with two or four raised lines decurrent from the leaves. Buds erect ..... 7. Square-stalked Willow-herb.
      - Stem cylindrical. Buds nodding ..... 8. Marsh Willow-herb.

THE FUCHSIA FAMILY.

HABITATS AND LOCALITIES.

1. Common Enchanters'-wort—(*Circæa Lutetiána.*)

In shady woods and groves, loving rocky banks under trees, tolerably common. Mere Clough and thereabouts. Lymm Woods. Woods in the Reddish Valley. Fl. June, July.

Curtis, i. 148; E. B. xv. 1056; Baxter, i. 9.

A very elegant little plant, immediately distinguished by its reflexed and bristly seed-pods.

2. Alpine Enchanters'-wort—(*Circæa alpina.*)

In the hollow called Wicken-hole, Seal Bark, Greenfield, plentiful, but only two or three inches high. (J. P.) Fl. July, August.

E. B. xv. 1057 (not good).

3. Rosebay Willow-herb—(*Epilobium angustifólium.*)

Moist banks, margins of damp woods, and on the borders of sheltered ponds, not very rare. Plentiful on Barton Moss. (J. S.) Borders of Chat Moss. Botany-Bay Wood, plentiful. (J. E.) Between Scoud Moor and Fo-edge. Longdendale, above Tintwistle. Several places between Marple and Strines, on the borders of ponds. (Mr. Sidebotham.) Fl. July.

Curtis, i. 96; E. B. xxviii. 1947; Baxter i. 14.

An admirable and very ornamental plant for suburban gardens, in which it is not infrequent, flourishing under the drip of trees, and in the smokiest of street purlieus.

4. Great Crimson Willow-herb—(*Epilobium hirsútum.*)

On the borders of streams and ditches, loving rich vegetable and alluvial soil, such as composes the sloping banks of rivers and cuttings subject to inundation in time of floods, common everywhere, and a frequent companion of the meadow-sweet. Fl. July, August.

Curtis, i. 93; E. B. xii. 838.

A noble and conspicuous flower, opening crowds of fine crimson blossoms as the heat of summer declines, and with a smell of baked apples, whence it is often called, in the country, "Apple-pie." Mr. Holland has gathered it with the petals white.

5. Small-flowered Willow-herb—(*Epilobium parviflórum.*)

By pondsides and in ditches, common. Fl. June, July.

Curtis, i. 94 (as *Epilobium villosum*); E. B. xii. 795.

6. Mountain Willow-herb—(*Epilobium montánum.*)

Dry shady banks, in woods, on roofs of cottages, and a common weed in gardens. Fl. July.

Curtis, i. 169; E. B. xvii. 1177.

7. Square-stalked Willow-herb—(*Epilóbium tetrágonum.*)
Sides of ditches and ponds, and in other watery and marshy places, common. Fl. July.

Curtis, i. 95; E. B. xxviii. 1948.

8. Marsh Willow-herb—(*Epilóbium palústre.*)
In similar situations, and equally common. Fl. July.

E. B. v. 346.

The charming fuchsia, with its pendants of crimson, purple, or white, like the descending fires of some splendid sky-rocket, is foremost in this beautiful family, and embodies all its best characteristics. It has been known in this country, in its oldest species, the *Fuchsia coccinea*, for above seventy years, having been introduced from Chili in 1788. There are now nearly twenty other species in cultivation, with innumerable varieties and hybrids. The prettiest, after the old scarlet, is the hybrid *globósa;* and the most remarkable species, the *Fuchsia fulgens*, of Mexico. The *Fuchsia excorticáta*, of New Zealand, has flowers of a dull greenish-purple hue. Next in interest come the *Œnotheras*, the yellow-flowered species of which handsome genus are commonly called "Evening primroses," and after these the lovely *Clarkias*. The tetramerous structure, eight stamens, and inferior ovary, at once distinguish them from all other inmates of the garden. Several other willow-herbs, in addition to the rosebay, are commonly cultivated, and occasionally, a curious little crimson-flowered annual, with only one perfect stamen, called *Lopézia.*

LXXXV.—THE WATER-FEATHERWEED FAMILY. *Halorágeæ.*

An inconspicuous family of about seventy aquatic and half-aquatic plants, found in ponds and ditches in almost all temperate countries, with flowers like those of the Fuchsia Family in general structure, but distinguished by their sessile stigmas and minute calyx. The blossoms are generally very small and insignificant, and in many cases deficient in some of the parts, some being unisexual by defect. One of this family, the mare's-tail, or *Hippuris*, presents the simplest known condition of a flower, having but a single stamen, and a single carpel, no petals, and a calyx of the smallest size.

Four species grow wild in England, and three of them near Manchester. They are aquatics, living wholly submerged, except when the flowers are raised above the surface of the water, with long, slender, much-branched stems, and whorled, sessile, finely-pectinated leaves, which render them exceedingly pretty for the aquarium. The flowers are minute, sessile, and unisexual, the upper ones having stamens only, the lower ones only pistils.

1. Flowers in leafless, many whorled, reddish-yellow spikes, three to five inches long, and *erect* while young. Leaves four in a whorl ..... } COMMON WATER-FEATHERWEED.

2. Flowers as in the preceding, but the lower or female flowers have pectinate bracts underneath them, and the spikes are *pendulous* while young. Leaves three or four in a whorl ..... } SLENDER WATER-FEATHERWEED.

3. Flowers all in the axils of leaves, and submerged along with them ..... } SUBMERGED WATER-FEATHERWEED.

HABITATS AND LOCALITIES.

1. COMMON WATER-FEATHERWEED—(*Myriophyllum spicátum.*)

Ponds and other stagnant waters about Stretford, Chorlton, Baguley, Blakeley, &c., common. Pond in Dunham Park. Stream running into Rostherne Mere. Fl. July, August.

E. B. ii. 83.

2. SLENDER WATER-FEATHERWEED—(*Myriophyllum alterniflórum.*)

Ponds at Baguley, Old Trafford, &c., not uncommon. Fl. July.

E. B., Supp. iii. 2854 (with magnified dissections).

Probably not distinct from the preceding.

3. SUBMERGED WATER-FEATHERWEED—(*Myriophyllum verticillátum.*)

Like the others, in ponds, and quiet recesses of streams, common. Old Trafford; Chorlton; Stretford; Lymm. Reservoir at Strines Print-works. Fl. July.

E. B. iv. 218; Baxter, v. 376.

Probably often overlooked, in consequence of its flowers not rising above the water.

The fourth British plant of this family, the *Hippuris* or mare's-tail, (Curtis, ii. 218.) is often confounded with the *Equisetum* or horsetail. There are several species of the latter, as will be found when we come to treat of the class of CORMOGENS, and most of them common near Manchester, but the *Hippuris* has not hitherto been found here.

LXXXVI.—THE MELASTOMA FAMILY. *Melastomaceæ.*

An extensive and splendid family, almost confined to the tropics, none being found in Europe, and scarcely a dozen in any other temperate latitudes. They have considerable affinity with the Myrtaceæ,

but differ from them in having no dots of scented oil upon the leaves; and not only from the Myrtaceæ, but from all other plants with which they can be compared, in having their long anthers bent down parallel with the filaments, and lying in niches between the calyx and the ovary. Positively they are also characterised by the strongly-ribbed leaves. The flowers are remarkably handsome, and have given many species a place in our hot-houses. Others are conspicuous for the beauty of their foliage, such as the *Sonerila margaritácea*, the large, broad, and green, but ribless leaves of which look as if sprinkled with seed-pearl. The species most esteemed for cultivation, on account of their flowers, belong to the genera *Rhexia*, *Blakea*, *Osbeckia*, *Melastoma*, and *Medinilla*. There are some superb plants of the last-named in the conservatory at Tatton.

LXXXVII.—THE COMBRETUM FAMILY. *Combretáceæ.*

A family of about two hundred beautiful trees and shrubs, the affinities as in the former, and natives of tropical Asia, Africa, and America. They are interesting as producers of the "myrabolams" used by the dyers, which are the fruit of the different species of *Terminalia;* and as including that splendid twining shrub of the hot-house, the *Combrétum purpúreum*, distinguished by its racemes of crimson flowers the size of May-blossom, with innumerable stamens projecting half an inch or more beyond the corolla. The leaves are oval and dotless. I have observed this magnificent plant in perfection at Mr. Yates's.

LXXXVIII.—THE CHILI-NETTLE FAMILY. *Loasáceæ.*

A little family of American plants, usually covered with stings like those of the nettle, and with gay yellow or reddish flowers, which recommend them for cultivation in spite of their hurting properties. The most showy is fortunately unprovided with stings, namely, that handsome golden-blossomed annual, the *Bartónia aúrea*. The leaves are usually feather-lobed, pinnatifid, or doubly pinnatifid; the peduncles are axillary and one-celled; the petals five or ten; the stamens numerous, and adhering by the base of the filaments into sheafs. In the true Loasas, commonly called, from their native

country, "Chili-nettles," the flowers are elegantly star-like, and the petals concave while young, the stamens lying back in them in as many bundles. Some of this genus are green-house twiners. The *Loasa tricolor*, like the *Bartonia*, thrives well in the open garden.

LXXXIX.—THE HAREBELL FAMILY. *Campanulaceæ.*

Herbaceous plants, with a tendency here and there to become shrubby, the sap often milky. Leaves almost always alternate, simple, undivided, linear, oval, heart-shaped, or roundish, often deeply toothed or angled, and exstipulate. Inflorescence various. Calyx of five united sepals; corolla regular, of five united petals, more or less bell-shaped (Fig. 157), and inserted upon the upper part of the calyx, the latter adherent to the solitary, two or more-celled ovary. Stamens inserted within the base of the corolla, and not upon its tube, equal in number to the petals, but never twice as many; the filaments often much dilated at the base; the anthers long and linear. Style solitary, covered with hairs; stigmas as many as the cells of the ovary, generally long, linear, curling outwards, and velvety on the external surface. Fruit a dry capsule, often almost globular, crowned by the withered calyx and corolla, and opening by irregular lateral apertures, or by valves at the upper part. Seeds numerous, minute, often glossy. The flowers are in almost every instance blue, sometimes diluted down to white; red and yellow are nearly unknown among them.

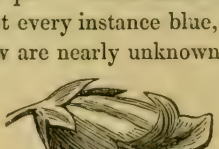


Fig. 157.
Flower of Campanula.

Several hundred species are known, natives chiefly of the north of Asia, Europe, and North America, and greatly ornamenting the countries where they grow. The milky juice is rather acrid, but on the whole, the properties are insignificant.

Thirteen species grow wild in England, seven of them occurring near Manchester. They are blue-flowered without exception, though varying at times to white.

A.—Flowers in dense convex heads, three-quarters of an inch across, and surrounded by a basket of many oval bracts; anthers united at the base, and projecting beyond the corolla, the segments of which are deep and narrow-linear. Stems six to ten inches high; leaves linear, wavy, rough; peduncles long and solitary. ..... 1. JASIONE.

B. — Flowers not in dense heads; lobes of the corolla broad and short; stamens free.

- Stems prostrate, weak, and thread-like, growing in lax tufts. All the leaves heart-shaped, with angular lobes, and stalked. Peduncles longer than the leaves. Flowers half an inch long, drooping at first. Capsule opening by valves at the top..... 2. IVY-LEAVED BELL-FLOWER.
- Stem erect; capsule opening by valves near the base.
  - Stem leaves linear or lanceolate, and entire, or nearly so. Flowers in lax panicles.
    - Lower leaves roundish, crenate, dying early; stems eight to fifteen inches high, glabrous, slender; flowers few, drooping; lobes of the corolla shorter than the tubular part.... 3. HAREBELL.
    - Lower leaves narrow-oblong, roughish; stem two to three feet high, hairy below; lobes of the corolla as long as the tubular part ..... 4. RAMPION.
  - Stem leaves ovate-lanceolate or heart shaped, and toothed. Flowers in the axils of the upper leaves.
    - Flowers two or more together, forming loose terminal clusters; plant rough and hairy; leaves like those of the nettle, heart-shaped at the base, with large, unequal teeth ..... 5. NETTLE-LEAVED BELL-FLOWER.
    - Flowers axillary and solitary, forming leafy and terminal racemes.
      - Stem quite simple, rounded, two to four feet high; leaves tapering at the base; flowers erect while in bloom..... 6. GIANT BELL-FLOWER.
      - Stem slightly branched, two feet high; flowers always drooping ..... 7. CREEPING-ROOTED BELL-FLOWER.

THE HAREBELL FAMILY.

HABITATS AND LOCALITIES.

1. Jasione—(*Jasione montána.*)

Dry hedgebanks, common. Boggart-hole Clough; Mobberley; plentiful in the lane leading from Mere Clough towards Clifton Viaduct. Fl. July, August. Annual or biennial.

Curtis, ii. 278; E. B. xiii. 882; Baxter, v. 373.

A pretty little plant, with so much the aspect of a *Scabiosa*, that it is often called "Sheep's Scabious;" and so much resembling the Compositæ in its united anthers, that Linnæus classed it with them.

2. Ivy-leaved Bell-flower—(*Campánula hederácea.*)

Banks of the Etherowe, near Mottram; and Whiteley Dean, near Rochdale. (J. P.) Fl. June—September.

Curtis, iii. 464; E. B. ii. 73.

3. Harebell—(*Campánula rotundifólia.*)

Everywhere on dry hedgebanks and grassy heaths, lingering till the very sunset of the autumn.

Curtis, ii. 238; E. B. xiii. 866; Baxter, i. 61.

One of the most graceful and admired of English wild-flowers, often called, from the slenderness of its stems, the *hair*-bell.

"E'en the light hairbell raised its head
Elastic from her airy tread."

4. Rampion—(*Campánula Rapúnculus.*)

Formerly and perhaps still in a meadow between Mere Clough and the river Irwell. (J. P.) Fl. July, August.

Curtis, iii. 462; E. B. iv. 283.

5. Nettle-leaved Bell-flower—(*Campánula Trachélium.*)

In a wood near Brookhouse Moss. (Mr. J. Sidebotham.) Fl. July, August.

Curtis, iii. 461; E. B. i. 12.

Rather beyond the limits of our Flora, but too interesting a plant to be left unnoticed, and possibly to be found much nearer home.

6. Giant Bell-flower—(*Campánula latifólia.*)

Woods and hedgebanks, where the vegetation is plentiful. Near Pendleton, Clifton, and Barton. Abundant about Cotterill, Bowdon, Mobberley, and near Lymm, in the lane leading from Thelwall to the Powder-mills; plentiful also on the banks of the Goyt, below Strines, and in the valley of the Tame. Fl. July, August.

E. B. v. 302.

The finest and most stately of the English Campanulas, the flowers an inch and a half long. This and the *rotundifólia* are the two common ones of the district.

7. Creeping-rooted Bell-flower—(*Campánula rapunculoides.*)

Naturalized in hedges about Dunham, Ashley, and in Bowdon Vale. (Mr. Geo. E. Hunt.) Found also at Withington. Fl. July, August.

E. B. xx. 1369.

This beautiful family is represented in gardens by the Canterbury-bell, or *Campánula médium*, sometimes called "steeple-bells," the ovary covered by the reflexed lobes of the calyx; the clustered bell-flower, or *Campánula glomeráta*, (Curtis, iv. 593.) with large deep-purple flowers in a compact head; the peach-leaved, or *Campánula persicifólia*, perfectly glabrous in every part, and with the lower leaves narrow-oblong; several small species resembling the wild *rotundifólia;* and a pretty little annual called "Venus' looking-glass," or *Prismatocárpus speculum*, with procumbent stems, the branches three-flowered, the calyx with long, linear, spreading lobes, and deep violet corollas, very sensitive to the light. In-doors there is also grown the splendid *Campánula pyramidális*, with light-blue rotate corollas, and the inflorescence pyramidal. Species of *Phyteuma*, *Adenóphora*, and the *Trachélium cœrúleum*, are likewise in cultivation.

XC.—THE CACTUS FAMILY. *Cactáceæ.*

The Cactus Family is composed of several hundred species of grotesquely succulent plants, almost always unprovided with leaves, and consisting only of angular stems, which are either tall, upright, and pillar-shaped; or slender, trailing, and snake-like; or branched into a number of thick flat two-edged joints, resembling the claws of a crab or lobster. In some extraordinary instances the stems are globular, and in nearly every case are defended on the angles or surface by a strong *chevaux-de-frise* of sharp thorns. The flowers are often of great size, usually handsome and brilliant, and formed of numerous lanceolate petals, crimson, rosy, or white, which, in the larger kinds, enclose a multitude of stamens on long filaments that resemble a tassel of white silk. They are always sessile, and for the most part very fugitive, usually lasting but a day or night. There are species in which the customary splendour is not attained, and where the flowers are insignificant, as in the case of the yellow-

blossomed *Rhipsalis*. The sepals are usually indefinite in number, and gradually merge into petals, so that it appears as if the flower were destitute of calyx, and the corolla gradually diminished outwards and downwards into coloured bracts. They are often scattered over the whole surface of the ovary, which is large and long, and resembles a fleshy peduncle. The latter ripens into a succulent, many-seeded fruit, which is either insipid, or refreshing and agreeable. Such is the case with the celebrated fruit called the "Indian fig," occasionally imported from the West Indies, and sold in the shops under the name of the "Indian pear."

Four principal forms of these remarkable plants may be discriminated, all of them common in green-houses. When the stem is flattened and two-edged, with shoots growing from the joints, they are called *Opuntias*, or prickly pears; when tall, pillar-like, unbranched, and with many angles, they are termed torch-thistles; when very long, weak, and slender, so as to hang down in pendulous tails, they are called *Céreuses;* and when globular and unbranched, they are called melon-thistles, or *Echinocacti* and *Melocacti*. Besides these, there are the species in which leaves are developed, but the latter are unusual.

America is the exclusive habitation of the Cactaceæ in the wild state, the greater portion occurring in the tropical parts. One or two species have naturalized themselves in the vicinity of the Mediterranean, but there is no reason to suppose that they are truly indigenous anywhere in the eastern hemisphere. The "night-blowing cereus" is remarkable for not opening its flowers till 10 p.m.; and the *Opuntia cochinillifer* is invaluable as the residence of the insect that furnishes cochineal.

XCI.—THE DAISY FAMILY. *Compositæ* or *Asteráceæ*.

The Daisy Family is the largest known to Botany, the estimate of species being 9,000. It is one of the best marked and soonest recognized, the characters lying in very small compass, and subject to little variation. The mass of the family consists of herbaceous plants, varying from the size of the daisy to that of the sunflower; but abroad there are many shrubby and almost tree-like species. In regard to stems and leaves, they present every conceivable variety, the only characters in which the latter agree throughout, being the negative

ones of absence of stipules, and of never being compound. The endless modifications of the "divided leaf" which they present, are referable, perhaps without exception, to the type called "feather-lobed." Several of the wild English species supply beautiful examples of the curious form called "runcinate," resembling a succession of arrow-heads, the point of each inserted into the base of the next above. (Fig. 158.) The structure of the flowers, which are invariably compound, was explained in the Introduction, pages 31—33. It is

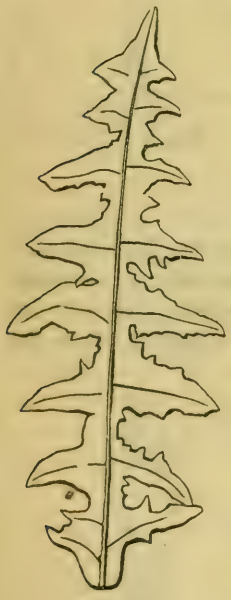


Fig. 158.
Runcinate leaf of Dandelion.

Figs. 159 and 160.
Lyrate leaves of Prenanthes.

merely necessary to add here, that the florets, both tubular and ligulate, are in many cases unisexual, and that sometimes the entire head is of the same character, or nearly so, as happens in the butterbur and the mountain-cudweed. The fruit consists of hard and dry achenia, in shape long and slender, and grooved, embossed and jewelled in the most beautiful manner. Every achenium is crowned, in the majority of species, with a tuft of fine white hairs, which usually spread hori-

zontally, forming a shallow cup. (Fig. 162.) Sometimes these hairs are fringed with still finer ones; and in some genera they are elevated upon a pillar, as represented in Fig. 163. The fruits of the daisy, the sunflower, the marigold, and many others, are destitute of crown

Fig. 161.
Receptacle.

Fig. 162
Sessile pappus.

Fig. 163.
Stalked pappus.

entirely; while in others, such as the *Bidens* and the *Tagetes*, it consists only of a few stiff bristles. (Fig. 165.) The hairs are in reality the enlarged *calyx*, which remains, as in the gooseberry, till after the fruit is ripe. Technically, this elegant little crown is called the

Fig. 164.
Ligulate floret (magnified).

Fig. 165.
Floret of Bidens
(magnified)

Fig. 166.
Tubular floret (magnified).

"pappus." It enables the wind to bear the fruits away rapidly, and to a long distance; and when all have been carried off, we see excellently the character of the "receptacle" or cushion on which they were seated, viz., that it is only the distended apex of the flower-stalk. (Fig. 161.)

In the description of the flowers of the Compositæ, on page 32, the distinction of the florets into "tubular" and "ligulate" was pointed out. (See Figs. 164 and 166.) The mode in which they are disposed and associated is threefold, and furnishes the means of dividing this vast family into three practical and well-defined sections.

The first comprises those species in which the florets are all *ligulate*, as in the dandelion. They are called the *Cichoráceæ* or chicory-like. (Fig. 167.)

The second comprises those in which there are none but *tubular* florets, as in the thistle. These are called *Cynarocéphalæ* or thistle-like.

The third comprehends the species in which the centre or disc of the flower is composed of tubular florets, and the ray or margin of ligulate ones, as in the field daisy. These are called *Corymbíferæ*

Fig. 167.
Compound flower, chicory-like.

Fig. 168.
Compound flower, daisy-like.

or daisy-like. (Fig. 168.) The only other conceivable disposition, namely, of tubular florets at the margin, and ligulate ones in the centre, has no examples in nature.

In connection with these facts, the following particulars are also worth observing:—

In the *Cichoráceæ* the head of florets is nearly flat; all the florets are provided with both stamens and pistil; and the style is not jointed below the stigmas.

In the *Cynarocéphalæ* the head of florets is usually globular; the florets are almost invariably bisexual; the style is jointed below the stigmas; and the corolla is generally much inflated below the mouth.

In the *Corymbiferæ* the florets are erect and parallel, except in a few cases where the receptacle is conical; they are frequently unisexual; the style is not jointed, and the corolla is never inflated.

The thistle-like and the chicory-like species seldom alter in appearance; their structure precludes it. But in the daisy-like species, when under cultivation, there is often considerable change. The tubular florets are converted into ligulate, producing the condition called "double," and shewn so conspicuously in the chief portion of our splendid dahlias, China-asters and chrysanthemums, which in the original wild state were shaped like daisies.

The chicory-like and the daisy-like species are exceedingly prone to close their flowers in the evening and in cloudy weather; a few kinds even close during sunshine, every species keeping to a definite hour both in its opening and its shutting. These beautiful and fascinating movements form a large part of the phenomena of the "sleep of plants," the Compositæ supplying the same kind and amount of illustration of it in their flowers, that the Leguminosæ do in their leaves.

Every variety of colour is found among the flowers of this vast family, which includes also some of the largest known blossoms, taking the *head* of bloom, that is, as a single flower. The constituent *florets* are among the smallest that can be found. They reserve their beauty in the main till advanced summer and mature autumn, which we may always discern to be fast approaching, by the profusion of their brilliant stars, whether in garden or field. The daisy, the colts-foot, and one or two others, are all that enliven the spring; the last flowers that give relief to the wistful eye, when it ranges round the fast-emptying borders of October, are the cheerful lilac and yellow asters of North America.

The Compositæ are diffused over every part of the world, but in very different proportions. In northern latitudes they are universally herbaceous, but towards the equator they become shrubby, and those of the island of St. Helena are chiefly trees. Their uses are as various as their forms. Very many are medicinal, supplying tonics, bitters, and aromatics; fine dyes are yielded by the safflower and others; and a good many are available for human food, such as the lettuce, and the Jerusalem artichoke, or *Helianthus tuberosus*, in its potato-like roots. The proportion of species in any way deleterious appears to be exceedingly minute.

About one hundred and thirty species are indigenous to the British islands, contributing very largely to their floral ornament, especially through the yellow chicory-like genera *Crepis*, *Apargia*, *Hieracium*, and *Hypochæris*, which in autumn replace the buttercups of spring. The thistles are no less conspicuous in their lively crimson, to say nothing of the daisies that bespangle the pastures most months of the year. Sixty-five, or one-half the number, occur near Manchester.

PRELIMINARY ANALYSIS.

SECTION 1.—*Flowers wholly yellow.*

A.—Flowers appearing before the leaves.
B.—Flowers appearing simultaneously with the leaves.
I. Leaves simple and undivided.
II. Leaves more or less pinnatifid, lobed, or jagged, p. 297.
III. Leaves doubly pinnatifid, p. 298.

SECTION 2.—*Flowers not wholly yellow.*

A.—Flowers with a yellow centre and white rays, p. 298.
B.—Flowers wholly white, p. 299.
C.—Flowers red, crimson, lilac, or violet, p. 299.
D.—Flowers sky-blue, p. 300.
E.—Flowers (scales of the basket) brownish or gray, p. 300.

PARTICULAR ANALYSIS.

SECTION 1.—*Flowers wholly yellow.*

A.—Flowers appearing before the leaves; their stalks three to six inches high, and covered with scales; the ray-florets needle-shaped. Leaves, when they appear, broadly heart-shaped, several inches across, angular, downy underneath .... 45. COLTSFOOT.

B.—Flowers appearing simultaneously with the leaves.

I. Leaves simple, varying in different species from lanceolate to round or heart-shaped, often toothed or waved at the edges, but neither jagged, lobed, nor pinnatifid.

* Stems one-flowered, leafless, three to four inches high; florets all ligulate.

Plant with prostrate, hairy branches; leaves oblong, entire, hairy; flowers lemon-coloured, fragrant 14. MOUSE-EAR HAWKWEED.

Plant without prostrate branches; leaves lanceolate, toothed ..... 2. HAIRY HAWKBIT.

** Stems many-flowered, branched, one to three feet high.

a. Florets both tubular and ligulate.

Flowers in large, handsome panicles; lower leaves elliptical, upper ones lanceolate ..... 46. GOLDEN-ROD.

Flower-heads three to five, on long, leafless peduncles, the earlier ones overtopped by the later; radical leaves deeply cordate, upper ones ovate..... 53. LEOPARD'S-BANE.

Flower-heads in a loose terminal corymb, ray-florets four to five; leaves ovate-lanceolate, toothed, glabrous; stem smooth, angular } 52. BROAD-LEAVED RAGWORT.

Flower-heads somewhat corymbose; ray-florets linear; leaves oblong, much waved, clasping the stem with rounded auricles; whole plant woolly or cottony ..... 54. COMMON FLEABANE.

Flower-heads few, distant; leaves oblong, with a few deep teeth at the end; plant glaucous 57. CORN MARIGOLD.

b. Florets all tubular. Leaves lanceolate, serrate, glabrous; flowers greenish-yellow, half-drooping 33. COMMON BIDENS.

c. Florets all ligulate.

Leaves nearly all radical, ovate, petiolate, and growing in a rosette, variable in edge and point. Seldom more than one leaf upon the stem ..... 15. WALL HAWKWEED.*

Leaves dispersed all over the plant.

Plant more or less hairy.

Stem with rosettes of leaves at the base, at the time of flowering, ovate and petiolate.. 16. WOOD HAWKWEED.*

Stem without a radical rosette of leaves at the time of flowering.

Upper stem-leaves all tapering at the base, and usually narrow ..... } 18. NARROW-LEAVED HAWKWEED.

Upper stem-leaves short and broad, and rounded at the base ..... } 17. SHRUBBY AUTUMNAL HAWKWEED.

Plant glabrous.

Leaves narrow, grass-like, six or eight inches long, channeled, and entire ..... 1. YELLOW GOATSBEARD.

Leaves oval, toothed, three or four inches long, those of the stem sharply pointed, and clasping it with long pointed auricles..... 12. MARSH CREPIS.

* These two are connected by intermediates which it is impossible to refer either to one name or to the other, and cannot be regarded as truly distinct. (See the remarks on the genus *Hieracium*, at the end of the family.)

II. Leaves simple, oblong, or egg-shaped, more or less deeply jagged or lobed; often runcinate, and sometimes inclining to pinnatifid.

* Stems many-flowered.

Leaves all, or nearly all, from the root.

Leaves rough on both sides; stem glabrous; basket hairy ..... 6. Common Cat's-ear.

Leaves glabrous, or nearly so.

Leaves oblong, wavy, toothed; small bracts among the florets ..... 5. Smooth Cat's-ear.

Leaves long, narrow, somewhat pinnatifid; no bracts among the florets ..... 4. Autumnal Hawkbit.

Leaves dispersed over the whole plant.

Leaves cleft into three to five long, lanceolate, toothed segments ..... 34. Three-lobed Bidens.

Leaves lyrate, or lobed, and partly pinnatifid.

a. Florets all tubular; scales of the basket with black tips ..... 47. Common Groundsel.

b. Florets both tubular and ligulate; the latter minute and recurved. Plant fragrant.. 48. Heath Groundsel.

c. Florets all ligulate.

Florets only four to five. Leaves lyrate, purple underneath, the terminal lobe angled. Panicle branched in all directions.... 7. Lyrate Lettuce.

Florets more than four or five.

A. Basket angular; florets sixteen; radical leaves lyrate, green on both sides ..... 20. Nipplewort.

B. Basket not angular. *Achenia angular.*

Plant covered with stiff, spreading hairs. 13. Bristly Crepis.

Plant glabrous, or nearly so.

Leaves runcinate and pinnatifid, the lobes of the upper ones curving towards the apex, their edges entire ..... 11. Smooth Hedge Crepis.

Leaves runcinate, the upper ones oval, and sharply auricled ..... 12. Marsh Crepis.

C. Basket not angular. *Achenia flattened.*

Leaves chiefly runcinate, the edges toothed, and more or less thorny.

a. Basket hairy at the base; auricles short, broad, and rounded ..... 8. Corn Sow-thistle.

b. Basket hairy at the base; auricles narrow and pointed ..... 10. Marsh Sow-thistle.

c. Basket glabrous; flowers lemon coloured, inconspicuous ..... 9. Common Sow-thistle.

** Stems one-flowered.
Leaves glabrous, runcinate; stem glabrous, hollow, and milky-juiced ..... 19. DANDELION.
Leaves more or less hairy. Flower-buds drooping before they open.
Leaves lanceolate, waved, toothed, or a little pinnatifid; basket and peduncles smooth.... 2. HAIRY HAWKBIT.
Leaves runcinate; basket hairy ..... 3. ROUGH HAWKBIT.

III. Leaves deeply and often doubly pinnatifid. Flowers in corymbs.
Florets all tubular. Plant strongly scented.
Leaves broadly oval in outline, five to eight inches long, doubly and minutely pinnatifid ..... 36. TANSY.
Leaves almost circular in outline, two to three inches across, cut into fine, linear, oblong, and obtuse lobes. Whole plant grayish-white with close and silky down. Flower-heads half-pendulous..... 37. WORMWOOD.
Florets both tubular and ligulate.
Corymb scanty and irregular; flower-heads few and large; lower leaves egg-shaped ..... 50. FEW-FLOWERED RAGWORT.
Corymb dense, with numerous flowers.
Leaves irregularly pinnatifid..... 49. COMMON RAGWORT.
Leaves with narrow and uniform divisions ..... 51. SLENDER RAGWORT.

SECTION 2.—*Flowers not wholly yellow.*

A.—*Flowers with a yellow centre and white rays.*
Stems procumbent; scapes three inches high, one-flowered; petals often pink on the under side. Leaves obovate..... 55. DAISY.
Stems upright, branched, and many-flowered.
1. Leaves oblong, pinnatifid at the base; flowers two to three inches across, on stalks fifteen inches high, solitary, and conspicuous.... 56. GREAT OX-EYE DAISY.
2. Leaves pinnate, the segments ovate or oblong, and pinnatifid; plant strong-smelling; flowers numerous, their rays very short.. 58. FEVER-FEW.
3. Leaves twice or thrice pinnatifid, with numerous linear or hair-like divisions. Disk of the flower more or less convex or conical.
Plant glabrous.
Plant scentless; stem spreading ..... 59. MAY-WEED.
Plant strong-smelling.
Scales membranous at the edge; plant fœtid 63. FŒTID CHAMOMILE.
Scales not membranous at the edge; plant faintly aromatic ..... 60. FALSE CHAMOMILE.
Plant more or less downy and hoary with minute silky hairs.
Scales pointed; plant hoary ..... 62. CORNFIELD CHAMOMILE.
Scales obtuse, or sometimes torn at the end; plant powerfully aromatic ..... 61. TRUE CHAMOMILE.

B.—*Flowers wholly white* (corymbose).

Stems one to three feet high; florets of the ray five to ten.

Leaves linear, lanceolate, serrated ..... 65. SNEEZEWORT.

Leaves six to eight inches long, narrow, and doubly pinnatifid, the segments hair-like..... 64. YARROW.

Stems three to four inches high; shoots procumbent; leaves white underneath..... 39. MOUNTAIN CUDWEED.

C.—*Flowers red, crimson, lilac, or violet.*

* Flowers appearing before the leaves expand, in a dense egg-shaped panicle, six to twelve inches high.... ..... 44. BUTTERBUR.

** Flowers cotemporaneous with the mature leaves.

Leaves opposite, in three to five broadly-lanceolate coarsely-toothed lobes; stems three to four feet high; flowers lilac; pistils longer than the florets..... 35. LILAC HEMPWORT.

Leaves alternate.

† Stem and leaves more or less thorny.

Leaves beautifully variegated with white veins; scales very long, thorny at the edges, and recurved ..... 25. MILK-THISTLE.

Leaves without white veins.

Inner scales large, yellowish, and spreading horizontally. Plant rigid, dry, six to eighteen inches high ..... 30. CARLINE-THISTLE.

All the scales green; inner ones not longer.

Flower-heads large and few, far apart, and very handsome.

Leaves decurrent. Scales with long and very sharp points.

Heads erect. Pappus consisting of simple hairs ..... 26. SPEAR-THISTLE.

Heads drooping. Pappus consisting of feathery hairs ..... 24. MUSK-THISTLE.

Leaves not decurrent, soft, and almost thornless. Scales obtuse, or with a very minute point ..... 29. MELANCHOLY-THISTLE.

Flower-heads numerous, clustered, and inconspicuous.

Stem three to four feet high, slender, scarcely branched; very thorny leaves, decurrent and recurved.... 27. MARSH-THISTLE.

Stem eighteen to twenty inches high; much branched, leaves scarcely decurrent; scales appressed..... 28. FIELD-THISTLE.

†† Stem and leaves entirely destitute of thorns.
Scales ending in hooks; stem three to four feet high; leaves broadly heart-shaped ..... 22. BURDOCK.
Scales not ending in hooks.
All the leaves much divided.
Flowers few, large, far apart, and thistle-like, the inner scales of the basket tinged with purple; leaves pinnatifid, their segments finely serrated ..... 23. SAW-WORT.
Flowers very numerous, small, and crowded.
Flowers in immense panicles, dull red; stems three to five feet high; leaves white underneath ..... 38. MUGWORT.
Flowers in umbels or corymbs; leaves long, narrow, and triply pinnatifid; the segments hair-like; stem eighteen inches high ..... 64. ROSE YARROW.
Leaves all, or at least the upper ones, simple and undivided.
Leaves white underneath; stems nearly simple, four inches high; flower-heads unisexual; scales pink ..... 39. MOUNTAIN CUDWEED.
Leaves green on both sides, rough; stems one to two feet high, branched; flowers thistle-like; scales black and fringed.. 32. HARD-HEADS.

D.—*Flowers sky-blue;* plant two to three feet high.
Leaves runcinate; flowers sessile, axillary, and in pairs ..... 21. FIELD CHICORY.
Leaves linear, entire, or nearly so; flowers on long stalks; plant hoary..... 31. CORN-FLOWER.

E.—*Scales of the basket brownish or gray;* stems three to eighteen inches high, nearly covered with white down; leaves linear-lanceolate, undivided.
Flower-heads fine brown, in an elongated leafy spike; stems unbranched..... 40. UPRIGHT BROWN CUDWEED.
Flower-heads in lateral or terminal clusters.
Clusters surrounded by leaves much longer than the heads; stem much branched and diffuse ..... 41. SPREADING CUDWEED.
Surrounding leaves shorter, or scarcely longer.
Stem branched at the summit only; the principal head sessile ..... 42. PROLIFEROUS CUDWEED.
Stem repeatedly branched and forked from the base upwards ..... 43. LEAST CUDWEED.

In regard to their fruits, the Manchester Compositæ may be classed as follows :—

I.—Achenium entirely destitute of crown.

Nipplewort,	Corn-marigold,
Wormwood,	Chamomile,
Mugwort,	Yarrow,
Daisy,	Sneezewort.
Ox-eye,	

II.—Achenium with a minute membranous border.

Chicory,	Fever-few,
Tansy,	May-weed.

III.—Achenium with two or four serrated bristles.

Bidens. (Fig. 165.)

IV.—Achenium crowned with a sessile plume. (Fig. 162.)

A.—*Hairs white.*

Thistle,	Groundsel,
Lyrate Lettuce,	Ragwort,
Sow-thistle (snowy),	Butterbur,
Crepis,	Coltsfoot (snowy).

B.—*Hairs tawny or brownish.*

Hawkweed,	Cudweed,
Corn-flower,	Burdock,
Hard-heads,	Hawkbit.

V.—Achenium lengthened into a shaft, with a plume upon the summit. (Fig. 163.)

Goatsbeard,	Dandelion.
Cat's-ear,	

In some cases sessile and shafted plumes occur together, as in the smooth cat's-ear; and occasionally plumed and plumeless achenia, as in the hairy hawkbit.

HABITATS AND LOCALITIES.

I.—FLOWERS CHICORY-LIKE—(Sub-family *Cichoráceæ.*)

1. Yellow Goatsbeard—(*Tragopógon praténsis.*)

In meadows, among the mowing grass. Plentiful about Agecroft, Jackson's Boat, Reddish, Gatley Carrs, below Bowdon old Church, and in the fields by the Bollin, between Ashley and Cotterill. On the railway banks between Stockport and Cheadle Station, just after leaving the tunnel, abundant. Fl. June. Biennial.

E. B. vii. 434; Baxter, v. 390.

The lark, when it comes to *reveillé* the early botanist, is not sooner with its sweet song than the petals are to expand; and by six o'clock, when most other

flowers are still folded, this one has opened the full disk of its delicate bloom. By ten or eleven, though the sun be hot and bright, the blossoms begin to close, and in the afternoon the plant is discoverable only by its leaves. The heads of fruit resemble those of the dandelion, but are often four or five inches in diameter, and the individual fruits the finest examples that I am acquainted with, of the shafted and plumed achenium. From the base to the crown they frequently measure an inch and a half, while the rays are interwoven, and form a beautiful concave and circular net. The goatsbeards are distinguished from our other wild composites, not only by the grassy form of their foliage, but by the basket being as long or longer than the florets. They are subject to the attacks of a minute parasitic fungus, which converts the unopened head of flowers into a mass of purple dust.

2. Hairy Hawkbit—(*Thrincia hirta.*)

On dry banks, in gravelly fields, and on moors. Hale Moss. Common about Wilmslow. Fl. July, August.

Curtis, iii. 423 (as *Leontodon hirtum*); E. B. viii. 555 (as *Hedypnois hirta*); Baxter, v. 323.

3. Rough Hawkbit—(*Apargia hispida.*)

Meadows and pastures, especially near the banks of rivers, common. Abundant about Bowdon. Fl. June, July.

Curtis, ii. 348 (as *Leontodon hispidum*); E. B. viii. 554 (as *Hedypnois hispida*); Baxter, iv. 318.

The bristles upon the leaves, both of this species and the preceding, are forked like the letter Y.

4. Autumnal Hawkbit—(*Apargia autumnalis.*)

Fields and waste places, abundant everywhere. Fl. August.

E. B. xii. 830 (as *Hedypnois autumnalis*).

5. Smooth Cat's-ear—(*Hypochæris glabra.*)

Occasionally at Bowdon. Fl. July, August. Annual.

Curtis, i. 198; E. B. viii. 575.

6. Common Cat's-ear—(*Hypochæris radicata.*)

Meadows, pastures, and hedgebanks, wherever there is grass, and the ground is dry. Fl. July.

Curtis, i. 197; E. B. xii. 831; Baxter, vi. 406.

7. Lyrate Lettuce—(*Lactuca muralis.*)

In woods and shady cloughs, frequent; also upon old walls. Abundant in the woods at Styal, and in the Reddish Valley. Ashley

Woods; Cotterill Clough; Arden Hall. About Kenyon and Little Hulton, plentiful. (R. H.) Fl. July. Biennial.

Curtis, ii. 350; E. B. vii. 457 (both as *Prenanthes muralis*); Baxter, i. 27.

A very distinct and remarkably elegant plant, the stems rising from one to two feet high, with lyrate leaves in very curious diversity, as represented in Figs. 159 and 160, and large angularly-branched panicles of yellow heads, about half an inch across, each of which contains five ligulate florets, and thus resembles a simple flower of five petals.

8. Corn Sow-thistle—(*Sónchus arvénsis.*)

Ploughed fields, among corn, beans, &c., and generally indicative of a cold and undrained soil. Very fine and abundant near Carrington Moss, among oats. Fl. August.

Curtis, ii. 273; E. B. x. 674.

The large golden-yellow blossoms rival those of the dandelion, and are borne on stalwart stems that tower above everything else in the field.

9. Common Sow-thistle—(*Sónchus oleráceus.*)

Waste and cultivated ground, especially in ploughed fields, common. Plentiful on hedgebanks near Lymm. Fl. June—August. Annual.

Curtis, i. 131; E. B. xii. 843; Baxter, ii. 147.

10. Marsh Sow-thistle—(*Sónchus palústris.*)

Near Walmesley House, Bedford, occasionally. (R. H.) Fl. July, August.

Curtis, ii. 351; E. B. xiii. 935.

11. Smooth Hedge Crepis—(*Crépis vírens.*)

Meadows, pastures, dry hedgebanks, clover-fields, and often upon old roofs, common everywhere. Fl. July, August. Annual.

Curtis, ii. 347; E. B. xvi. 1111 (both as *Crépis tectórum*); Baxter, v. 366.

12. Marsh Crepis—(*Crépis paludósa.*)

Moist woods and cloughs, especially by splashy mossy springs and the sides of little streams, common. Abundant in Mere Clough. Fl. August.

E. B. xvi. 1094 (as *Hierácium paludósum*).

13. Bristly Crepis—(*Crépis setósa.*)

A plant indigenous to the south-eastern parts of Europe, and introduced into our neighbourhood with the imported seeds of Italian

rye-grass. Its first appearance seems to have been in 1847, when it sprang up abundantly in a field near the Dog-house Farm, Withington, and in one or two other fields at the Withington end of Hough-End Clough. The following year it shewed itself among rye-grass at Eccles, and though not since noticed at the latter place, has been seen, somewhere or other, nearly every summer subsequently. It should be looked for in clover-fields, as well as among crops of rye-grass. Fl. June, July. Annual.

E. B., Supp. iv. 2945.

Some botanists distinguish this and one or two other species of Crepis under the generic name of *Börkhausia*, because of the distinct and slender beak of the achenium; the *C. virens*, the *C. paludósa*, &c., having it contracted at the top, and without a distinct beak.

14. Mouse-ear Hawkweed—(*Hierácium Pilosélla.*)

Dry hedgebanks, delighting in the most sunny and drouthy situations, where it can bask in the noontide ray, common. Very abundant about Alderley. Fl. May—July.

Curtis, ii. 274; E. B. xvi. 1093.

Immediately distinguished from all our other composites by its long, hairy procumbent shoots, and the pale lemon-colour of the solitary blossoms, which, in favourable seasons, and when in perfection, have the smell of raspberry jam. No hotness of sunshine ever seems to make this little heaven-gazer thirsty.

15. Wall Hawkweed—(*Hierácium murórum.*)

On rocky ground, and walls slightly covered with crumbling earth, rare. Marple, and about Lymm. Fl. June.

E. B. xxix. 2082.

16. Wood Hawkweed—(*Hierácium sylváticum.*)

On banks, old park walls, and in dry woods, especially where rocky, and the soil is shallow. Plentiful at Broadbottom. Fl. August.

E. B. xxix. 2031.

The leaves are often beautifully spotted and blotched with purple.

17. Shrubby Autumnal Hawkweed—(*Hierácium Sabaúdum.*)

Dry hedgebanks, and on dry ground in thickets, woods, and groves, plentiful everywhere. Abundant about Burnage and Fallowfield. Fl. August—October.

E. B. v. 349.

18. NARROW-LEAVED HAWKWEED—(*Hierácium umbellátum.*)

Dry hedgebanks, rather rare. Chorlton and thereabouts. Bowdon, near the Grange Farm. (Mr. Hunt.) Little Hulton. (R. H.) Boothstown. (J. E.) Fl. July, August.

Curtis, iii. 422; E. B. xxv. 1771; Baxter, iii. 165.

19. DANDELION—(*Leóntodon Taráxacum.*)

Where is it *not?* Water alone forms no part of the territory of this brilliant and flaring weed, which is in bloom more or less all the year, but most profusely in early summer.

Curtis, i. 58; E. B. viii. 510; Baxter, iii. 163.

The name "Dandelion" is popularly applied to all the large yellow compositæ of the fields, but this is the only species to which it properly applies. If the flower be gaudy and inelegant, nothing can be prettier than the globe of white-plumed seeds which follows it,—"clocks" for the time-curious children, as they blow the little ships adrift into the aërial sea. On the medicinal virtues of the dandelion, see "Manchester Walks and Wild-flowers," chap. ii.

20. NIPPLEWORT—(*Lapsána commúnis.*)

Hedgebanks and waysides, common everywhere. Fl. July, August. Annual.

Curtis, i. 59; E. B. xii. 844; Baxter, ii. 150.

21. FIELD CHICORY—(*Cichórium Intybus.*)

In cultivated and waste ground, where the soil is dry and light, occasionally. Chorlton, Mobberley, Sale, Bowdon, and elsewhere in that district, but not to be depended on. Plentiful in the lane leading from Astley to Irlam; and by hundreds in a turnip-field at Tyldesley, in 1858, the seeds doubtless brought in with those of the crop, and seemingly from a foreign country, since along with the fine azure of the *Cichorium* were mingled plants of Egyptian wheat, of an exotic *Ononis*, one or two exotic species of *Anthemis*, and a beautiful exotic *Euphorbia*, with a dichotomous stem and perfoliate leaves. (J. E.) Fl. July, August.

Curtis, ii. 276; E. B. viii. 539; Baxter, vi. 417.

II.—FLOWERS THISTLE-FORM—(*Cynarocephalæ.*)

22. BURDOCK—(*Arctium Lappa.*)

Waste places and waysides, but not very common. Mobberley. Hazle Grove. Near Riddings Brook, Lymm. Fl. July, August. Biennial.

Curtis, ii. 275; E. B. xviii. 1228; Baxter, v. 333.

The scales of the basket terminate in hooks, which readily catch hold of clothing, and fasten themselves pertinaciously. The leaves are remarkable for the beauty of their wavy outlines, and being large, conspicuous, and picturesque, are often introduced by artists into the foreground of their landscapes.

23. Saw-wort—(*Serrátula tinctória.*)

Cultivated fields and in thickets, rather rare. Field at the head of Mere Clough. (J. P.) Between Gorton and Reddish. Landside, near Tyldesley, plentiful. (J. E.) In a field between Monton and Eccles, growing among *Rosa arvensis*, plentiful. (J. S.) Mobberley, in stiff clay land, in open fields, and by hedgesides, plentiful. (Mr. Holland.) Fl. August.

E. B. i. 38; Baxter, iii. 174.

24. Nodding Musk-thistle—(*Cárduus nútans.*)

Fields near the roadside between Disley, Whaley, and past Whaley, on the road to Buxton. Once found at Worsley. (J. E.) Fl. July—September. Biennial.

E. B. xvi. 1112; Baxter, iii. 177.

25. Milk-thistle—(*Cárduus Mariánus.*)

Occasionally about Bowdon and elsewhere, probably truant from a garden, being often cultivated for the sake of its beautiful leaves, which are laced with milk-white veins. Fl. July.

Curtis, i. 199; E. B. xiv. 976.

This truly noble and ornamental plant is further distinguished by the great recurved, and often thorny scales of the basket.

26. Spear-thistle—(*Cárduus lanceolátus.*)

Roadsides and waste places, everywhere; one of those indomitable plants which return to the charge again and again, with such amusing and troublesome valour, overthrow them as often as we may. Fl. July—October. Biennial.

E. B. ii. 107; Baxter, vi. 410.

This is the species usually believed to be the national emblem of Scotland. (See "Titan," vol. xxvi., p. 339.)

27. Marsh Thistle—(*Cárduus palústris.*)

Ditches, sides of ponds, in moist hollows, and marshy meadows, common everywhere. Fl. July, August. Biennial.

Curtis, iii. 120; E. B. xiv. 974.

The only indigenous thistle which grows habitually in wet places, and distinguished by this circumstance not less than by its crowded clusters of small and sessile heads, and slender, wand-like stems, rising four to five feet high, and branched only at the summit.

28. Field Thistle—(*Cárduus arvénsis.*)

Roadsides and waste places, everywhere. Fl. July.

Curtis, iii. 421; E. B. xiv. 975.

29. Melancholy Thistle—(*Cárduus heterophyllus.*)

Fields, very rare. Plentiful in the corner of a field near Mellor, Derbyshire, 1858. (Mr. J. Sidebotham.) Formerly plentiful on the ground at the head of Mere Clough, where the Asylum now stands. (J. P.) In a field near the "Waggon and Horses," on the road between Bolton and Bury. (Mr. William Horsefield.) Fl. July.

Curtis, iii. 521; E. B. x. 675.

"The name "Melancholy" is given to this thistle from the pathetic and elegant languor with which the blossoms hang their heads.

30. Carline-thistle—(*Carlina vulgáris.*)

The only known station for this curious plant, in our neighbourhood, is at Greenfield, Saddleworth, where it grows plentifully in a field lying about a hundred yards from the road, on the right hand side, and about half a mile before reaching Bill's-o'-Jack's. The gentian keeps it company. Fl. June. Biennial.

E. B. xvi. 1144; Baxter, vi. 405.

The Carline-thistle is known by the long inner scales of the basket, which are straw-coloured, shining, and spread out like the rays of a star, so as to resemble petals. In dry weather they are horizontal; but when the atmosphere becomes damp, they rise up and form a conical pent-house over the florets, after the manner of the white rays of the daisy. Their texture is like that of the "everlastings." The plant being very dry and rigid, often endures through the winter.

31. Corn-flower—(*Centauréa Cyanus.*)

In cornfields, occasionally. Sale. Clifton Moss. (R. H.) Fl. July—September. Annual.

Curtis, iii. 426; E. B. iv. 277; Baxter, i. 35.

A very common flower in gardens, where the colour varies to white, red, and purple; but none of the varieties are so charming as the original azure-blue. In past ages the corn-flower was an abundant weed among cereal crops, and with the scarlet poppy, a conspicuous ornament of them up till harvest-time. Along with the corn-marigold and other agricultural offenders, it is now in comparative subjection, and near Manchester can hardly be said to remain. The genus *Centaurea* is distinguished, both among the *Cynarocephalæ* and the family in general, by the large, vase-like, and neuter or empty florets, each with five long narrow lobes, which form a coronet round the head in most of the species.

32. Hard-heads—(*Centauréa nigra.*)

On grassy hedgebanks, and at the edges of dry fields and old pastures, common everywhere. Fl. July—October.

E. B. iv. 278.

Remarkable for the absence of the coronet usually found in the *Centaureas*, and for the dark brown colour, amounting almost to blackness, of the basket, the scales of which are curiously fringed. Few plants last longer in bloom. In October they blend their crimson with the blue of the Campanula, and console the autumn to its close. The stems are remarkable for their toughness.

III.—FLOWERS DAISY-FORM—(Sub-family *Corymbiferæ.*)

(The flowers of the common groundsel and of several other species included in the *Corymbiferæ*, consist of tubular florets alone, and hence would seem more appropriately placed among the *Cynarocéphalæ*. But, as we have before had occasion to observe, in classing plants according to their natural affinities, *single* characters are subordinate to the *mass* of characters, and such exceptions as those before us do not falsify the general rule. The affinities of the rayless Corymbifers are palpably with the rayed ones, and not at all with the *Cynarocéphalæ*.)

33. Common Bidens—(*Bidens cérnua.*)

Edges of ponds and ditches, usually quite in the water, and forming dense patches of a yellowish-green hue, common. Abundant in the pond by Arden Hall. Fl. July—September. Annual.

Curtis, i. 200; E. B. xvi. 1114.

34. Three-lobed Bidens—(*Bidens tripartita.*)

Waste wet places, and on the edges of ponds, but not like the preceding, actually *in* the water. Found also in cultivated fields where the soil is moist. Like the pimpernel and many others, this plant is fond of sauntering into town, and lodging in gardens for a year or two, after which it usually disappears. Common about Stockport and Heaton Norris. Fl. July, August. Annual.

Curtis, ii. 277; E. B. xvi. 1113; Baxter, vi. 446.

35. Lilac Hemp-wort—(*Eupatórium cannábinum.*)

Banks of rivers and in wet woods and cloughs, a great lover of the shade, and not uncommon. Mere Clough; Ashley meadows; Hale Moss. Crookley Wood, near Stockport, plentiful. Fl. July, August.

E. B. vi. 428; Baxter, iii. 178.

The only British Composite with flowers not yellow, and the leaves *opposite*. Remarkable also, like the rest of its genus, for the great length of the deeply-cloven styles.

36. Tansy—(*Tanacétum vulgáre.*)

Hedgebanks and waste places, generally near rivers. Banks of the Mersey, more or less all the way from Cheadle to below Lymm, and especially abundant towards Thelwall and the Powder-mills. Fl. August.

E. B. xviii. 1229; Baxter, i. 24.

Immediately known by the powerful odour of its large, very finely and doubly pinnatifid leaves; stems two to three feet high, and flat corymbs of yellow button-like flowers. It is very common in gardens, being cultivated both as a potherb, and for its disfavour among fleas.

37. Wormwood—(*Artemísia Absínthium.*)

Banks of the Irwell, near the "Nag's Head," Barton. (J. E.) Under the walls of Chorlton Churchyard. Fl. August.

E. B. xviii. 1230.

Common in gardens, its well-known aromatic and bitter qualities rendering it useful both for medicinal purposes and those of domestic economy.

38. Mugwort—*Artemísia vulgáris.*)

Hedgebanks and on waste ground by waysides, common. Plentiful between Bowdon and Rostherne, and about Bramhall and Lymm. Fl. August, September.

E. B. xiv. 978.

39. Mountain Cudweed—(*Gnaphálium dioícum.*)

Mountain heaths. Greenfield; Fo-edge; and near Mottram. Also upon Kinder Scout. Fl. June, July.

E. B. iv. 267; Baxter, iv. 243.

Common in gardens, both white and rose-coloured. A very elegant little plant, the stems rather numerous, three to four inches high, the leaves green on the upper surface, and white upon the under. The rose-coloured flowers are generally the stameniferous ones.

40. Upright Brown Cudweed—(*Gnaphálium sylváticum.*)

Dry gravelly and sandy ground, both where exposed, and in thickets, not uncommon. Plentiful about Pendleton and Agecroft; in fields near Haughton Dale; and on Knutsford Moor. Fl. August.

E. B. ii. 124 (as *Gnaphalium rectum.*).

41. Spreading Cudweed—(*Gnaphálium uliginósum.*)

Moist ploughed land, and in waste places where water has settled and been absorbed not long before, common. Sale; Baguley; Chorlton; Denton. Fl. August, September. Annual.

E. B. xvii. 1194.

42. Proliferous Cudweed—(*Filágo Germánica.*)

Dry fields, commons, and green hillocks where broom grows, but rather unusual. Tolerably frequent at Bowdon, and plentiful near Mellor Church, Derbyshire. Fl. June, July. Annual.

Curtis, iii. 523; E. B. xiv. 946 (both as *Gnaphálium Germánicum*).

43. Least Cudweed—(*Filágo minima.*)

Dry sandy and waste places, rather uncommon. Lindow Common and thereabouts; near Arden Hall; plentiful on Knutsford Moor, and tolerably frequent about Bowdon. Fl. June, July. Annual.

E. B. xvii. 1157 (as *Gnaphálium minimum*).

44. Butterbur—(*Petasites vulgáris.*)

Upon the banks of all the rivers about Manchester, and on the alluvial flats formed by their overflows, in the greatest profusion; also in wet corners of old meadows, where the soil is deep and sandy, and in cloughs where the stream is apt to overflow. Fl. April, May, before the leaves appear.

Curtis, i. 132, and iii. 527; E. B. vi. 430 and 431 (both as *Tussilágo Petasites* and *T. hybrida*); Baxter, ii. 139.

The leaves of the butterbur are the largest produced by any plant that grows wild in our country, competing with those of the rhubarb in their vast dimensions. Growing close together, and lifted upon stalks that are seldom less than two feet long, and often much longer, they form thick and almost impenetrable jungles on the river-banks, and in places similarly favourable to their development. They have been observed in rich alluvial soil as much as six feet in height, and ample enough to give shelter from a shower of rain. The flowers are among the earliest of the spring, appearing while the leaves are not larger than one's hand, and resembling hyacinths in general figure. The bees are glad when they arrive. After blossoming, the stems lengthen immensely, growing to an altitude of a yard or more, and branching into innumerable peduncles, every one of which bears a globular tuft of white-plumed fruits at the extremity. Broad at the base, and gradually tapering upwards, the plant is then changed into a magnificent pagoda. Unhappily, when it invades land set apart for tillage, the butterbur becomes one of the most vexatious spoilers the farmer is troubled with.

45. Coltsfoot—(*Tussilágo Fárfara.*)

On moist clay land, in pastures, waste places, by waysides, near brick-field pits, and on the banks of rivers, very common everywhere. Fl. March, April, before the leaves appear.

Curtis, i. 133; E. B. vi. 429; Baxter, ii. 91.

The coltsfoot is one of the earliest and prettiest flowers of the new year, coming when the poplars begin to redden, and the honeysuckles to grow green, and the voice of the throstle waxes plentiful and joyous,

"And Winter, slumbering in the open air,
Wears on his smiling face a dream of Spring."

The blossoms are of a light but agreeable yellow, the ray-florets as slender as needles, and the flower-stalks downy and covered with scales, by which it is immediately distinguished from the dandelion, the stem of the latter being perfectly smooth. The heads droop after blooming, but as soon as mature, erect themselves again, and turn into spheres as soft and shining as the whitest satin. They are ripe just about the time of the blossoming of the yellow broom.

46. Golden-rod—(*Solidágo Virg-aúrea.*)

Hedgebanks, thickets, and in dry woods, loving the shelter of furze and other bushes. Plentiful at Bowdon, Mobberley, and at Irlam's-o'th'-Height. Fl. July—October.

E. B. v. 301; Baxter, iii. 238.

One of the most shewy of the English composites, blooming abundantly and spiritedly, but without ostentation.

47. Common Groundsel—(*Senécio vulgáris.*)

Everywhere as an ineradicable weed, and flowering, more or less, all the year through. Annual.

Curtis, i. 61; E. B. xi. 747.

48. Heath Groundsel—(*Senécio sylváticus.*)

On dry hedgebanks, especially upon the borders of cultivated moorland, and where furze, brake, or similar plants have been cut and burnt the previous autumn. Plentiful on the edges of Ashton Moss. Fl. July, August. Annual.

E. B. xi. 748.

49. Common Ragwort—(*Senécio Jacobæa.*)

Roadsides and in waste ground, everywhere. Fl. July—October.

E. B. xvi. 1130.

About Lymm this ubiquitous weed is called "Kadle-dock." It is a plant of remarkable powers of endurance, flourishing on arid ground where other things are overpowered by the sun, yet bearing the cold of autumn with indifference, and lasting in copious bloom till the end of November. The leaves are distinguished from those of all our other native composites by the crispy and waved margins of their numerous lobes.

50. Few-flowered Ragwort—(*Senécio aquáticus.*)

Moist waysides, common everywhere. Fl. July, August.

E. B., xvi. 1131.

51. Slender Ragwort—(*Senécio tenuifólius.*)

Dry hedgebanks, not infrequent. Chorlton; Stretford; Leigh; Rostherne; Patricroft; Stockport; Alderley, by the road to Wilmslow; and abundant between Hyde and Apethorne. Fl. July, August.

Curtis, ii. 356 (as *Senecio crucæfolius*); E. B. viii. 574.

52. Broad-leaved Ragwort—(*Senécio Saracénicus.*)

Abundant at the bottom of a croft at Blackammon, near Astley; at Boothstown (in one locality), and at Tortec, near Barton, growing four to five feet high. (J. E.) "Left bank of the Mersey, opposite Woolston, near Warrington." (B. G.) Fl. July, August.

E. B., xxxi. 2211.

53. Leopard's-bane—(*Doróuicum Pardaliánches.*)

By the side of a little stream between Knutsford and Toft, 1855. Fl. June, July.

Curtis, iii. 524; E. B., Supp. i. 2654; Baxter, ii. 157. (E. B. ix. 630 is the *Doronicum plantagineum.*

54. Common Flea-bane—(*Pulicária dysentérica.*)

Moist waysides and near ponds, frequent, especially where the land is heavy and cold. Victoria Park; Bowdon; Wilmslow. Fl. August, September.

Curtis, i. 201; E. B. xvi. 1115 (both as *Inula dysentérica*).

Well distinguished by its soft and hoary foliage, and the ray-florets being fine and slender, like those of the coltsfoot.

55. Daisy—(*Bellis perénnis.*)

Meadows, pastures, and waysides, everywhere; in bloom, more or less, all the year round, the robin of field-flowers, but in the plenitude of its innocent beauty in early summer. Children say that when the foot can be placed upon nine daisies at once, spring is at its height. After frostless winters, it is abundant by the middle of February. I have seen fields, in mild warm districts, quite inundated with it on the 20th.

Curtis, i. 62; E. B. vi. 124; Baxter, i. 44.

Many varieties occur in gardens,—the double white, the double white and pink, the deep crimson double, with the florets quilled, and that curious plant, the "hen and chickens," in which a number of smaller daisies sprout from underneath the principal one.

56. Great Ox-eye Daisy—(*Chrysánthemum Leucánthemum.*

Among mowing-grass, when the fields are crowded, and upon railway slopes, common everywhere. Abundant and very luxuriant about Timperley and Northen. Fl. June, July.

Curtis, iii. 354; E. B. ix. 601.

For an account of this magnificent flower, the Goliath of the field daisies, see "Walks and Wild-flowers," chap. viii. About Levenshulme it is called "Moon-penny."

57. Corn Marigold—(*Chrysánthemum ségetum.*)

In ploughed fields and among corn, a shewy but noxious weed. Formerly very plentiful at Bowdon, but now much reduced by the cleaner farming, which will soon render the garden the only refuge both of this and of many other original attendants of the cerealia. Fl. June—August. Annual.

Curtis, iii. 424; E. B. viii. 540; Baxter, iv. 306.

58. Fever-few—(*Pyrethrum Parthénium.*)

Hedges and waste places, but generally near houses or gardens, and hence doubtfully wild. Sandy Lane, Bowdon; Ashley; Broughton. Fl. July.

E. B. xviii. 1231; Baxter, i. 20.

Very common in old-fashioned gardens, especially in the trim enclosures surrounding wayside cottages. The whole plant has a powerful but not unpleasant odour, though said to be offensive to bees.

59. May-weed—(*Pyrethrum inodórum.*)

Waste ground and on the borders of fields, common everywhere. Fl. August till late in autumn.

Curtis, iii. 525; E. B. x. 676.

60. False Chamomile—(*Matricária Chamomilla.*)

Cornfields and waste ground, rare. Cornfields near Rostherne. Old Trafford. Gorton. Near Arden Hall. Fl. August. Annual.

Curtis, ii. 355; E. B. xviii. 1232; Baxter v. 335.

61. True Chamomile—(*Anthemis nóbilis.*)

By the roadside near Turner's Print-works, Hayfield, sparingly; and the same upon Monton Green, on the contrary side from the chapel, where it was first noticed by Mr. John Shaw. Twenty-five years since it was abundant there, but the Green being free pasture, and incessantly cropped, as well as pared for the sake of its turf, by 1849 it had nearly disappeared. Since then a little has come up

again, shewing the tenacity with which plants cling to spots where they have once flourished. Fl. August.

E. B. xiv. 980.

Commonly cultivated in gardens, though most of the chamomile flowers sold by the druggists are brought from a distance. The smell has been from time immemorial compared to that of ripe apples, and the very name is Greek for "ground apple." Chamomile makes delightful soft green walks for a flower-garden, only they must not be trodden upon in frosty weather. To lie down upon a bed of it, and snuff up the fragrance, is a capital cure for the headache.

62. Cornfield Chamomile—(*Anthemis arvensis.*)

Cultivated fields, very unusual, and appearing chiefly among clover. Fields on the top of Bowdon Downs, and below Bowdon Vicarage. (Mr. Hunt.) Waysides at Eccles. (J. S.) Fl. July. Biennial.

E. B. ix. 602.

63. Fœtid Chamomile—(*Anthemis Cótula.*)

Waste places and by waysides, rare. Previous to 1857 it grew plentifully by the side of the railway between Old Trafford and Stretford, but the change of the surface at the time of the Art Treasures Exhibition nearly caused its destruction. Fl. July, August. Annual.

Curtis, ii. 353; E. B. xxv. 1772; Baxter, v. 328.

64. Yarrow—(*Achilléa Millefólium.*)

Hedgebanks and in waste places, everywhere. Fl. July—November.

Curtis, iii. 425; E. B. xi. 758.

65. Sneezewort—(*Achilléa Ptármica.*)

Dry meadows, waste places, and on the borders of cornfields, abundant everywhere. Fl. July—September.

Curtis, ii. 352; E. B. xi. 757; Baxter, i. 36.

Common in gardens with double flowers.

In addition to the above-mentioned sixty-five, the following Composites have either formed part of the Manchester Flora in days gone by, or prefer some kind of claim to be inserted in it:—

Purple Goat's-beard—(*Tragopogon porrifolius.* E. B. ix. 638.) "Prestwich, 1844." (B. G.) Probably an escape from a garden, having formerly been cultivated for culinary purposes.

Acrid Lettuce—(*Lactúca virosa.* E. B. xxviii. 1957.) Once found near Chaddock Lane. (J. E.)

ORANGE HAWKWEED—(*Hierácium aurantiacum.* E. B. xxi. 1469.)

Formerly grew at Failsworth, a locality quoted over and over again in general Floras, but destroyed many years ago.

TRIDENTATE HAWKWEED—(*Hierácium tridentatum.*)

"Didsbury," &c. (B. G.) A form of the protean plant which, under other aspects, is called *H. murórum*, *H. pulmonarium*, *H. Lapeyrousii*, &c. &c.

The *Hieracia*, in one or two instances, resemble the *Rubi*, sporting into varieties which, with authors who deem them species, make the genus appear to contain between thirty and forty for Britain alone. The true native species probably do not exceed seven, viz., the four Manchester ones,—*Pilosella*, *Sabaudum*, *umbellatum*, and *murorum* (the latter including *sylvaticum)*; and three almost confined to the alpine parts of the country,—the *prenanthoides*, *cerinthoides*, and *alpinum*. The student who may wish to explore the subject, should consult Mr. Backhouse's "Monograph of the British Hieracia," in which the principal British forms are carefully described, and located under thirty-three specific names.

WHITE COLTSFOOT—(*Tussilágo alba.*)

Naturalized at Ellenbrook, Worsley; Crowbank, Atherton; and in Atherton Wood; growing abundantly in all three places. (J. E.)

FLEABANE—(*Erigeron ácre.* E. B. xvii. 1158.)

Formerly found on the remains of Sale Moor, and at Barton, but has not been seen in either place for several years.

The magnitude and general showiness of the Composite Family presignify its position in the flower-garden. Few, however, of its species make their appearance before midsummer; they are flowers especially of the autumn, when the marvellous dahlia, the China-aster, and a thousand others, blend their brilliant stars and globes, and outnumber every other blossom of the season. The chief of them belong to the genera *Coreopsis*, *Helianthus*, *Zinnia*, *Tagetes* (the latter including the French and African marigolds), *Achillea*, *Centaurea*, *Gaillardia*, *Calendula*, &c. Some of the chief favourites are of the kinds called "Everlastings," from the dry and chaffy texture of the basket, and the brilliant colour of the same part, which combine to keep them beautiful objects for many years after they have been gathered. To this division belong the *Helichrysum*, the *Xeranthemum*, the *Antennaria*, and the lovely pink and silver *Rhodanthe*. The old-fashioned large blue centaury of May is the *Centaurea montana*; the common annual sun-flower, *Helianthus annuus*; the common marigold, *Calendula officinalis*. No plants are more diversified than the *Cinerarias* of the green-house in spring, and the *Chrysanthemums* of mid-winter. The finest conservatory plants

of this family are the *Aphelexis humilis* and the *Astelma eximia*. Of culinary and economic plants there are also a good many. The lettuce, the artichoke, endive, wormwood, southernwood, the Jerusalem artichoke, which is a kind of perennial sun-flower, scorzonera, salsafy, and several others, testify that the family is useful as well as gay. The noblest examples of the composite structure are the sun-flower, as regards breadth of disc and size of florets; the artichoke, as regards the basket; the goatsbeard, as regards the fruit.

XCII.—THE VALERIAN FAMILY. *Valerianáceæ.*

Herbaceous plants, often disposed to be succulent, six inches to four feet high. Leaves opposite, undivided, or pinnatifid. Inflorescence usually cymose. Flowers small, but numerous, and gay, from their plenty and lively roseate colours; usually rather irregular, tubular, with generally five lobes, and sometimes a spur at the base. Stamens one to five, inserted into the tube of the corolla; stigmas one to three.

Fig. 169.
Flower of Valerian
(magnified).

Fig. 170.
Fruit of Valerian
(magnified).

Fruit small and dry, externally resembling an achenium, but with three cells, two of which are empty, and the other with a solitary ovule in it. The calyx (which, as in all the other families of this group, is adherent to the ovary, and thus appears to grow upon its summit) is either membranous, or like that of such Compositæ as have the fruit crowned with a sessile plume. (Page 292.) Here, however, while young, it is curved inwards, and almost imperceptible, as shewn in Fig. 169, not unrolling until the fruit is nearly ripe, when it becomes the rosette of feathery hairs by which the resemblance is established, and which is represented in Fig. 170. Some species are twining, and many are either strong-scented or aromatic, and in their roots tonic, bitter, antispasmodic, and vermifugal. They grow chiefly in the temperate parts of the old world and of South America. Eight species are indigenous, and five are found near Manchester.

- **A.**—Stems nearly simple; leaves more or less pinnatifid or pinnate; flowers white, tinged with pink. Stamens three. Calyx expanding, as the fruit ripens, into a feathery crown.
  - Stem two to four or five feet high, erect, furrowed, more or less hairy at the base. Leaves all elegantly pinnatifid, with from nine to twenty or more narrow segments, one or two inches long, and serrated; the upper leaves few and distinct. Flowers in broad terminal and lateral corymbs, several inches across ..... 1. GREAT LILAC VALERIAN.
  - Stems six to twelve inches high. Lower leaves egg-shaped, stalked, and undivided; upper ones lyrate and irregularly pinnatifid, the lobes entire. Flowers in small corymbs, and generally unisexual by defect. 2. SMALL ROSE VALERIAN.
- **B.**—Stems never more than fifteen inches high, repeatedly forked; leaves narrow-lanceolate or oblong, and undivided; flowers minute, blueish, in compact cymes, a quarter to half an inch across. Calyx usually forming a cup-like border to the fruit, not feathery.
  - Stem branched from the base, three to six inches high. Fruit compressed, without any perceptible border on the top. ..... 3. COMMON CORN-SALAD.
  - Stem branched chiefly towards the top.
    - Fruit ovoid, without any perceptible border on the top 4. KEELED CORN-SALAD.
    - Fruit compressed, crowned by a small oblique and tooth-like border ..... 5. NARROW-FRUITED CORN-SALAD.

THE VALERIAN FAMILY.

HABITATS AND LOCALITIES.

1. Great Lilac Valerian—(*Valeriána officinális.*)

On moist ditch-banks, by rivers, and in swampy places in woods, common. Fl. July.

Curtis, ii. 367; E. B. x. 698.

2. Small Rose Valerian—(*Valeriána dioica.*)

Marshy and swampy places, but not very general. Cotterill; Hale Moss; abundant by Rostherne Mere, on Knutsford Moor, and in Burley-Hurst Wood, Mobberley; foot of Mere Clough; valleys of the Medlock and the Tame. Fl. May, June.

Curtis, ii. 220; E. B. ix. 628.

Both these plants are remarkable, like the *Montia*, for their three stamens to a five-parted corolla.

3. Common Corn-salad—(*Fédia olitória.*)

Dry hedgebanks and by waysides, not uncommon. Abundant in the lane behind Hough-End Hall. Fl. May, June. Annual.

Curtis, ii. 296; E. B. xii. 811 (both as *Valeriana Locusta*).

4. Keeled Corn-salad—(*Fédia carinàta.*)

In the garden of the cottage occupied by the widow of the late John Horsefield, at Besses-o'th'-Barn, where it comes up every year. (J. P.) Also found at Bowdon. Fl. May, June. Annual.

E. B., Supp. ii. 2810; Baxter, vi. 432.

5. Narrow-fruited Corn-salad—(*Fédia dentàta.*)

Cornfields, not infrequent. Bowdon. Fl. June. Annual.

E. B. xx. 1370 (as *Valeriana dentata*).

In gardens there are the great crimson valerian, or *Centranthus ruber*, (E. B. xx. 1531.) with broadly lanceolate, entire leaves, and beautiful corymbs of small crimson blossoms, each with a long spur, and a solitary stamen; the heart-leaved, or *Valeriana Pyrenaica*, (E. B. xxiii. 1591.) with cordate and serrate leaves, and pale rose-coloured flowers; and the very curious little *Fedia cornucopiæ*, so named from the great distension of the upper part of the stem, and the compact character of the inflorescence, which seems as if flowing out of a "horn of plenty."

XCIII.—THE STYLIDIUM FAMILY.—*Stylidiáceæ.*

A little family belonging chiefly to the swamps of New Holland, and interesting to Manchester botanists as containing the very curious plant from which it takes its name, and which occurs in good greenhouses. The foliage is simple; the flowers are numerous, irregular, small, and inconspicuous, but distinguished from those of all other exogens, by having the filaments of their two stamens blended with the style into a long column, which hangs over one side of the corolla until it is touched, when it starts up, and shifts to the opposite side, like a frightened animal. The stigma lies in a cavity at the apex of the column, concealed by the anthers.

XCIV.—THE MOCK-ORANGE FAMILY. *Philadelpháceæ.*

A little family of ornamental shrubs and small trees, foreign in every species, and hence only known in gardens. The only very common one, out of doors, is the deliciously fragrant "syringa," or mock-orange (*Philadélphus coronárius*), a tree usually rising to the height of eight or ten feet, with ovate, acuminate, finely serrate, and glabrous leaves; and racemes of large cream-white flowers, usually four-petaled, with numerous stamens, and a powerfully-aromatic odour, resembling that of the orange blossom. The *Deutzia scabra* occurs now and then in shrubberies, and the *Deutzia humilis*, a tiny shrub, with abundant milk-white flowers, in delicate racemes, is becoming almost as common as the fuchsia. These two may be known by their oval-lanceolate leaves, and the remarkably broad and flattened filaments of their numerous stamens. The leaves of the *Deutzia scabra* are rough, and when examined with the microscope, found to be covered with minute stars.

XCV.—THE LOBELIA FAMILY. *Lobeliáceæ.*

A family of elegant plants, resembling the Campanulas in habit, shape of leaves, milky sap, inflorescence, and the general structure of the flowers and fruit, but differing from them in their almost invariably united anthers, and the irregularity of the corolla, which consists of a cylindrical tube, expanded at the upper part into five long and narrow

divisions, the two upper ones smaller, and forming an upper lip, the three lower ones larger, and diverging, so as to form a three-cleft and pendulous lower lip. Here, moreover, the grains of pollen are oval, whereas in the Campanulas they are spherical, and the corollas are often of a fine bright red, a tint unknown among the bell-flowers. They prefer countries within or upon the borders of the tropics, numbering three or four hundred species, and are in every case to be suspected, if not positively dangerous, on account of the excessive acridity of their milky juice.

Two grow wild in England, but neither of them near Manchester, where the family is represented only in the superb crimson cardinal-flowers, *Lobélia fulgens* and *Lobélia splendens;* the pretty little blue *Lobélia bellidifólia;* the elegant blue and white-flowered annuals called *Clintónia;* and the handsome red and orange-coloured *Siphocámpylus.* The last-named is confined to the green-house.

XCVI.—THE SCABIOUS FAMILY. *Dipsáceæ.*

Herbaceous plants, one to four feet high, in foreign countries sometimes undershrubby. Leaves opposite, simple, undivided, or pinnatifid. Flowers numerous, small, collected, like those of the Compositæ, into dense heads, which are either conical or hemispherical, and surrounded by a many-leaved basket. Peduncles of the heads usually six or eight inches long. Calyx like that of the composites; corolla like that of the tubular florets of the same plants, but irregular, and often only four-lobed. Stamens four, their anthers wholly unconnected, and often with long filaments, which throw up the anthers like a fine lilac or white powder on the mass of blossoms. Pistil one; stigma not cleft; ovary one-celled, with a single ovule, and ripening into a dry achenium, crowned by the permanent calyx as in the composites. Every floret is inserted into a small basket of its own, having the appearance of an outer calyx. The opposite leaves distinguish them from such of the Parsley Family as have the flowers in compact heads, the Eryngo for example.

About one hundred and fifty of these plants are known, natives principally of the countries bordering the Mediterranean. Their properties are unimportant, though their flowers, which are lilac, white, rosy, or purple, are often gay and ornamental. Six grow wild in England, five of them occurring near Manchester.

- A.—Stem, flower-stalks, and ribs of the leaves more or less sprinkled with prickles, or very stiff and pungent hairs.
  - Flowers pale lilac, in an egg-shaped head three inches long.
    - Stem three to five feet high, stout and rough: leaves long, lanceolate, sessile; the upper ones connate, forming a cup round the stem, and collecting rain-water in considerably quantity. Flowers embedded among long, stiff, and *straight*-pointed bracts, and expanding in irregular patches ..... 1. Wild Teasel.
    - Like the preceding, but the bracts *hooked* at the end .... 2. Fullers' Teasel.*
  - Flowers white, in globular heads an inch in diameter. Stem two to four feet high, covered with stiff white hairs; leaves lyrate, coarsely toothed. Anthers much protruded ..... 3. Shepherds' Rod.
- B.—Stems, &c., without prickles or strong hairs.
  - Stem one to three feet high. Leaves very variable; the lower ones lanceolate; the upper ones toothed and pinnatifid. Heads of flowers often an inch and a half across; outer florets much larger than the central ones, and all of a delicate lilac or peach colour..... 4. Lilac Field Scabious.
  - Stems six to eighteen inches high. Leaves all ovate-lanceolate and undivided, or nearly so. Heads of flowers hemispherical, button-like, deep violet. Florets all, or nearly all, of the same size ..... 5. Purple Autumn Scabious.

THE SCABIOUS FAMILY.

* This can hardly be regarded as anything more than a variety of the wild teasel, originated, probably, under cultivation.

HABITATS AND LOCALITIES.

1. Wild Teasel—(*Dipsacus sylvéstris.*)

Dry places, by waysides, and on hedgebanks, very rare. Landside, near Leigh, and near Astley. (J. E.) Near Ashley, 1858. Warrington. (Mr. John Moss.) Fl. July. Biennial.

Curtis, i. 154; E. B. xv. 1032; Baxter, vi. 490.

2. Fullers' Teasel—(*Dipsacus Fullónum.*)

On the banks of the Irwell, near Clifton, but only a plant or two, the seeds probably brought from some fulling-mill further up the river. (J. P.) Fl. July. Biennial.

E. B. xxix. 2080.

The great brown prickly heads remain on the plant all through the winter, rejected even by the thorn-munching ass. They are used in dressing woollen cloth, and in some parts of England are raised in quantities.

3. Shepherds' Rod—(*Dipsacus pilósus.*)

In thickets on the right bank of the Bollin, above Cotterill Clough. (J. P.) Fl. August, September. Biennial.

Curtis, i. 10; E. B. xiii. 877.

4. Lilac Field Scabious—(*Knautia arvénsis.*)

Dry meadows and pastures, on railway slopes, the edges of cornfields, and by waysides, rather unusual. Abundant on the declivities of Werneth Lowe, descending towards Hyde; about Marple and Disley, and on Cobden Edge, above Strines. Sparingly about Bowdon, Ashley, Prestwich, Eccles, and Alderley. Fl. June, July.

Curtis, ii. 230; E. B. x. 659 (both as *Scabiosa arvensis*); Baxter, iii. 179.

This beautiful wild-flower accompanies the great ox-eye daisy in its bloom, and is a charming ornament of the edges of hayfields till swept away by the mower. It is remarkable as shewing the gradual transition from undivided to pinnatifid leaves. A white variety has been gathered at Alderley.

5. Purple Autumn Scabious—(*Scabiósa succisa.*)

Dry pastures, and on banks in dry woods, very common. Fl. August —October.

Curtis, i. 155; E. B. xiii. 878 (too blue); Baxter, iv. 277.

The garden representatives are restricted to species of *Scabiósa*, one of which, the *Scabiósa atropurpúrea*, is common and highly beautiful. The stems are slender and very much branched, the peduncles a foot or more long, and the flowers of a rich crimson-claret colour, the outer florets much larger than the inner ones, and the head sprinkled with white anthers. The scent is like that of honey.

XCVII.—THE COFFEE-TREE FAMILY. *Cinchonáceæ.*

The family which takes its name from the invaluable coffee-plant, is one of the largest with which botanists are acquainted, and contains some of the most useful trees and shrubs in the world. Some of the most important of known medicines are yielded by it, as Peruvian bark, quinine, and ipecacuanha, while other species give fruits and dyes. Like most other extensive families, it includes plants of great variety of figure and stature, but in its essential characters it is well-marked and strictly limited. The leaves are simple, quite entire, and opposite, with stipules between the petioles; the calyx is adherent; the corolla regular, of four or five united petals; and the stamens are seated on the petals, with straight anthers that open longitudinally.

The species, which are estimated at 2,500, belong almost exclusively to the hotter parts of the world, and in England are only known in conservatories. The fragrance and the beauty of the flowers of many kinds are unsurpassed, though their rarity and costliness prevent their often coming before the public. Among the choicest grown near Manchester, are the superb *Ixora*, with a vermilion umbel as broad as the hand; the white-winged *Mussænda*, with little yellow flowers resembling those of the jessamine; the incomparably odorous *Gardenia*, looking like a dishevelled white camellia; the *Bouvardia;* the coffee-tree; and the exquisite *Pentas carnea*, the only one that finds its way into shop-bouquets. The flowers of the latter are lilac, star-shaped, and borne in umbels. *Pentas rosea* is similar, but with very much darker petals.

XCVIII.—THE HONEYSUCKLE FAMILY. *Caprifoliáceæ.*

The honeysuckle and its kindred resemble the imperial family we have just parted with in almost all particulars of structure except the interpetiolar stipules, which here are not developed. Like the Cinchonaceæ, they comprise both shrubby and herbaceous plants; they have opposite leaves (which here, however, are sometimes serrate), an insignificant calyx, tubular flowers of five united petals, and a small fixed number of stamens seated upon the corolla, the flower being thrown to the summit of the ovary by the adhesion of the tube of the calyx to its surface. The ovary is three to five-celled, and the fruit usually a berry. There are over two hundred species, natives mostly

of the northern parts of the northern hemisphere, and recommended by properties of considerable interest. Independently of the fragrance of the honeysuckle, the virtues of the elder-tree are enough to attract attention. Six species grow wild in England, four of them occurring spontaneously near Manchester.

A.

Stem twining.

1. Stems slender, cord-like, scrambling up and over bushes and trees to the height of many yards. Leaves oblong, entire; flowers closely sessile, in terminal heads; corolla an inch and a half long, irregularly two-lipped, yellowish or pinky, and very fragrant. Fruit a head of red translucent berries, each the size of a pea ..... } WOODBINE.

B.

Stems not twining. Flowers in cymes, numerous and white.

* Leaves pinnate. Berries black.

2. Herbaceous plant. Segments of the leaves seven to eleven, lanceolate, the lowest short, broad, and close to the stems, resembling stipules ..... } DANEWORT.

3. Tree. Segments of the leaves five to seven, ovate; cymes of flowers five or six inches across ..... } ELDER.

** Leaves fan-lobed, entire. Berries crimson.

4. A small tree, glabrous in all its parts. Leaves two or three inches across, divided to near the middle into three broad, angular, pointed lobes. Flowers small, in cymes two or three inches in diameter, the outer ones much enlarged, so as to form a kind of ray or border, but destitute of stamens and pistils. Berries of a fine translucent crimson, and hanging on the tree till shrivelled by the frost ..... } WILD GUELDER-ROSE.

HABITATS AND LOCALITIES.

1. WOODBINE—(*Lonicera Periclymenum.*)

Hedges and in woods, everywhere. Tallest and most luxuriant in Atherton Wood, near Leigh, climbing to the very tops of the trees. Fl. summer and autumn.

Curtis, i. 15; E. B. xii. 800; Baxter, iv. 287.

2. DANEWORT—(*Sambúcus Ebulus.*)

"Near Dobeross, Saddleworth, and between Tyldesley and Bolton." (B. G.) Cultivated about Boothstown. (J. E.) Fl. July.

Curtis, i. 103; E. B. vii. 475; Baxter, ii. 122.

3. ELDER—(*Sambúcus nigra.*)

Hedges, everywhere. Fl. June, July.

E. B. vii. 476.

A variety called *laciniàta*, with the leaves finely and doubly pinnatifid, is not uncommon in gardens. Old editions of Withering mention it as wild "in hedges near Manchester." Another variety, having the foliage variegated with white, occurs sometimes in shrubberies. There is a plant of it by the sloping walk below Disley Church.

4. WILD GUELDER-ROSE—(*Vibúrnum Opulus.*)

Moist woods and glens, banks of rivers, and by streams, very common. Fl. June.

E. B. v. 332.

When in bloom, this is one of our most beautiful wild flowering-trees, the large white corymbs gleaming from afar amid the green foliage of the "leafy month of June;" and when hung with its lucid fruit in autumn, and the leaves aspire to be blood-red, the spectacle is hardly excelled by the mountain-ash. The "Guelder-rose" or "snowball-tree" of the gardens is the same species, with the whole of the flowers changed into the large flat neuter condition, causing the cyme to assume a globular shape. It has been found wild in Mere Clough. (J. P.)

Several foreign honeysuckles add to the beauty and sweetness of our gardens, and a good many pretty shrubs of the kind called the "Fly-honeysuckle," having the flowers in axillary pairs. The neatest is the native *Lonicera Xylósteum*, (E. B. xiii. 916.) distinguished by its downy foliage. To this family belong also the snowberry, that cheerful bush which towards autumn is dressed all over with milk-white berries the size of a marble; and the handsome undershrubs called *Weigelia* and *Leycesteria*. Old-fashioned *Viburnums* of different kinds are likewise scattered about, and abundance of that universal favourite, the *Laurustinus*, but the latter is rather too tender for our winters. The common garden honeysuckle is the *Lonicera Caprifolium*, (E. B. xii. 799.) a native plant, though rarely found wild. It is distinguished by the pairs of upper leaves being "connate," or united at the base so as to form a cup or flat plate round the stem, which apparently passes through the centre of it. The snowberry is the *Symphória racemósa*.

XCIX.—THE WOODRUFF FAMILY. *Galiáceæ* or *Stellatæ*.

These plants take the name of "Stellatæ" from the whorled or star-like character of their foliage. They are all herbaceous, with weak, slender, angular stems that usually trail or scramble among stouter plants. The leaves are never less than four together, and usually eight or nine, about an inch long, narrow-lanceolate, exstipulate, sessile, and pointed; the flowers small, regular, tetramerous, sometimes axillary and sessile, sometimes in little corymbs, more frequently in large loose panicles. Stamens four; style single, cleft at the top, with a capitate stigma to each branch; ovary below the flower; fruit

consisting of two small globular carpels, usually rough or bristly, and containing each a single seed.

Natives, to the extent of about three hundred species, of the northern parts of the northern hemisphere, and of high mountainous regions in Chili, Peru, and Australia. They have few properties of

Fig. 171.
Smooth Heath Galium.

Fig. 172.
Crosswort.

Fig. 173.
Woodruff.

any account, except in the case of the *Rubia*, the roots of which furnish the valuable dye known as "madder." Woodruff is remarkable for its hay-like fragrance when dry.

Twenty-one species grow wild in England, and eight of them are found near Manchester.

- **A.—Flowers yellow. Stems four to twelve inches high.**
  - Leaves oval-lanceolate, four together, soft and hairy; flowers in little axillary clusters shorter than the leaves, usually unisexual. (Fig. 172) ..... 1. Crosswort.
  - Leaves needle-shaped, six to eight together, and bent a little downwards; flowers in large upright panicles, and sweet-scented ..... 2. Sweet Yellow Galium.

- **B.—Flowers rosy-lilac or blueish. Stems four to twelve inches long, prostrate, and rough; leaves about six together, finely pointed; uppermost leaves seven or eight together, and forming a basket to the sessile umbel of flowers** ..... 7. Sherardia.

- **C.—Flowers white.**
  - Plant everywhere clothed with minute hooked prickles, and clinging to the fingers when handled. Stems several feet long, scrambling; leaves lanceolate, seven or eight together; flowers axillary, few together, and minute ..... 3. Cleavers.
  - Plant smooth; or if rough, not clothed with hooked and clinging prickles.
    - Stems simple, except at the base, erect, six to eight inches high. Leaves eight together; panicles thrice-forked; flowers on long stalks. (Fig. 173) 8. Woodruff.
    - Stems branched, sprawling and straggling.
      - Leaves ending in a fine point, six to eight together.
        - Stem rough with reflexed bristles; leaves lanceolate ..... 5. Small Rough Galium.
        - Stem smooth; leaves obovate. (Fig. 171) 6. Smooth Heath Galium.
      - Leaves obtuse, four or five together, upper ones generally of unequal size ..... 4. Marsh Galium.

THE WOODRUFF FAMILY.

HABITATS AND LOCALITIES.

1. Crosswort—(*Gálium cruciátum.*)

Hedgebanks, especially among bushes, the roots difficult to get at. Cheadle. Barton. Very common about Stretford. Fl. May, June.

E. B. ii. 143.

2. Sweet Yellow Galium—(*Gálium vérum.*)

Dry banks on the Buxton Road, between Disley and Whaley. Fl. July, August.

Curtis, ii. 377; E. B. x. 660; Baxter, iv. 294.

When luxuriant, an extremely pretty plant.

3. Cleavers—(*Gálium Aparine.*)

Hedges and waste places, everywhere, straggling up among the stouter plants. Fl. June, July. Annual.

Curtis, i. 81; E. B. xii. 816.

About Lymm called "Stickleback," from its notorious adhesiveness to our clothing.

4. Marsh Galium—(*Gálium pálustre.*)

By the sides of ditches and ponds, among reeds, water-mints, and other late-flowering semi-aquatics, on which it leans for support, common. Plentiful and luxuriant upon Hale Moss. Fl. July, August.

Curtis, iii. 451; E. B. xxvi. 1857.

5. Small Rough Galium—(*Gálium uliginósum.*)

In similar situations, but less common. Bog near the edge of Rostherne Mere. Fl. July, August.

Curtis, iii. 452; E. B. xxviii. 1972.

6. Smooth Heath Galium—(*Gálium saxátile.*)

Heaths, and in hilly pastures, where the turf is short, often making the ground quite white, and scarcely rising above the surface, very common. Fl. June—August.

E. B. xii. 815.

7. Sherardia—(*Sherardia arvensis.*)

On the borders of dry fields, common, especially where the soil is gravelly. Fl. June—September. Annual.

E. B. xiii. 891; Baxter, iv. 244.

8. Woodruff—(*Aspérula odoráta.*)

Shady woods and cloughs, abundant. Marple Wood; Styal; Reddish; Cotterill; Boggart-hole Clough. Fl. May, June.

Curtis, ii. 232; E. B. xi. 755; Baxter, i. 46.

A truly elegant little plant, with snow-white blossoms, the herbage scentless when fresh, but aromatic when dry.

The only plants of this family grown in gardens are the woodruff and the *Crucianélla stylósa*, the latter with lilac flowers borne in pretty terminal umbels.

C.—THE GOOSEBERRY FAMILY. *Grossulácеæ.*

Shrubs, occasionally armed with thorns. Leaves alternate, exstipulate, on long petioles, fan-lobed in three or five divisions, and usually serrate. Flowers axillary and solitary, or in axillary racemes. Calyx five-parted, often the largest and shewiest part of the blossom; petals five, regular, frequently minute; stamens five, very small; ovary single, underneath the blossom, ripening into a juicy berry, and bearing the withered relics of the flower upon its summit. The seeds are suspended among the pulp by long stalks.

Natives of the mountains, woods, and thickets of all the temperate parts of Europe, Asia, and America, but unknown in Africa. In America they are particularly abundant. It is from that country we have received the splendid *Ribes sanguíneum*, or scarlet-flowering currant, which hangs out its copious racemes to the earliest sunshine of the spring; the *Ribes speciósum*, or scarlet-flowering gooseberry, and the *Ribes aúreum*, or golden-flowered gooseberry, the latter almost as common as the *sanguíneum*. The *Ribes lacustre* and two or three other species are cultivated as garden ornaments, but they are of little pretension. Nearly a hundred are known in all, the properties of the common currant and gooseberry being those of the generality, except that in any but such as are cultivated for their fruit, a mawkish or extremely acid taste stands in place of the agreeable flavour for which the latter are esteemed.

Four grow wild in England, and all of them near Manchester. Whether any but the mountain currant be truly indigenous, is rather doubtful.

A.—*Stem thorny.*

1. Peduncles one or two-flowered; lobes of the leaves rounded ..... Common Gooseberry.

B.—*Stem thornless.*

*

2. Bracts longer than the flowers, which are usually unisexual and dicœcious; racemes erect; leaves small and shining; berries red ..... Mountain Currant.

**

Bracts shorter than the flowers, which are always bisexual.

3. Leaves glandular and fragrant; flowers cup-shaped; lower pedicels longer than the upper ones; berries black..... ..... Black Currant.
4. Leaves neither glandular nor fragrant; flowers nearly flat; pedicels all short; berries red or whitish .... Red Currant.

HABITATS AND LOCALITIES.

1. Common Gooseberry—(*Ribes Grossulária.*)

Cotterill Clough. Woods near Marple. Ashley Woods. Mobberley, by brooksides. Fl. March, April.

E. B. xviii. 1292.

2. Mountain Currant—(*Ribes alpinum.*)

Abundant in the hedges between Gorton and Reddish. (Mr. Sidebotham.) Woods at Styal. On the left bank of the half-dry brook below the reservoir, at the foot of Mere Clough (two large and leafy bushes). Not infrequent in gardens. Fl. April.

E. B. x. 704.

3. Black Currant—(*Ribes nigrum.*)

Cotterill Clough. Ashley Woods. "In a clough near Ashworth Wood." (B. G.) Fl. April.

E. B. xviii. 1291.

4. Red Currant—(*Ribes rúbrum.*)

Cotterill Clough (ripening fruit). Red Brows, below Northen. Gatley Carrs. Wood near Marple Aqueduct. Mobberley, by brooksides. Fl. April.

E. B. xviii. 1289; Baxter, v. 345.

Universal in gardens, with all the others that yield edible fruit.

CI.—THE PARSLEY FAMILY. *Umbellifer*æ or *Apiace*æ.

An extensive and very important family, in many cases notorious for deadly virulence; in others esteemed for pleasant taste of root or herbage, or for the aromatic and generous flavour of the seeds. The species are universally herbaceous, though some grow to the height of ten or twelve feet, and in England are remarkably alike in structure. Pinnatifid leaves, minutely and repeatedly sub-divided, so as to be popularly confounded with ferns, and compound umbels of numerous small white flowers, are present in all but seven or eight that occur wild. Abroad they are a good deal diversified. Those species which in England are exceptions, become the rule; while organs which in the native kinds are inconspicuous, are so much enlarged as to become

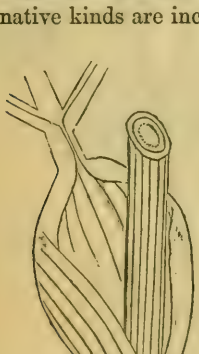


Fig. 174.
Dilated petiole.

Fig. 175.
Fruit, opened.

Fig. 176.
Fruit, unopened.

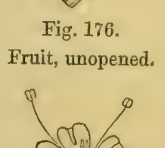


Fig. 177.
Flower (Caraway).

the most striking portion of the plant. In all cases, however, the family is marked beyond possibility of mistake, by the very peculiar condition of the flower and fruit. The former consists of five petals, usually curved inwards at the point, and inserted upon a fleshy disc that surmounts the ovary; five stamens, curved inwards while young, and a two-celled ovary, with two distinct styles. (Figs. 177 and 176.) The latter consists of two carpels, separable from an axis common to both, and to which they adhere until ripe, suspended from it in the mode represented in the drawing. (Fig. 175.) The technical name for this kind of fruit is "cremocarp." Whatever the foliage or the inflorescence, there is never any deviation in these particulars.

The great mass of the British species have hollow and furrowed stems, rising from one to three feet high, branched and erect, though a few semi-aquatic kinds are apt to sprawl. The leaves vary from quasi-pinnate to doubly and triply pinnatifid, the petioles generally

Fig. 178.
True Hemlock.

dilated at the base into large and sheathing covers for the young buds. (Fig. 174.) The flowers are borne in compound umbels, varying from one to twelve inches across, and either flat or hemispherical,

the smaller divisions of the inflorescence being called "umbellules." At the base of the rays or peduncles there are often several bracts, collectively called the "involucrum." The number and size of these bracts vary considerably in different species: sometimes they are confined to the umbel; sometimes they are repeated under the umbellule, in which case they are called the "involucel," and sometimes they are absent from both. The white, or yellowish, or pinkish petals are unequal in size, forming a small irregular star of five rays, which is flattish or somewhat concave. The individuals generally grow in large companies. Instead of solitary specimens, where there is one plant, there are usually a thousand not far off. Few can be said to have much claim to floral beauty, and many are dull weeds.

The properties of the family are of three principal and remarkably different kinds. In one section, a watery and acrid matter is present; in a second, a milky and gum-resinous secretion; and in a third, an

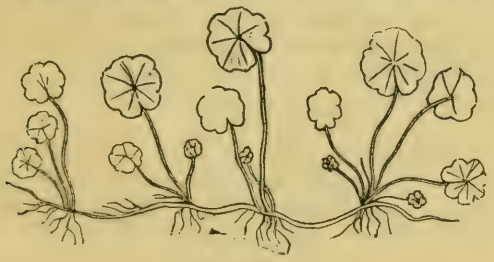


Fig. 179.
Marsh Pennywort.

aromatic and oily one. When the first of these predominates, they are poisons; the second in excess converts them into stimulants; the third renders them carminative and pleasant condiments. If both the acrid and the gum-resinous secretion be absent, they are often useful articles of food, as happens with the roots of the carrot and the parsnip. Among the poisons, hemlock or *Conium* holds the first place; after this come the fools'-parsley, the cowbane, and the drop-worts, all of them exceedingly dangerous. The species that yield gum-resinous matters are the asafœtida plant, the opoponax, the ammoniacum, and several others, well known to druggists and students of *Materia Medica;* while to those noted for their carminative properties, we owe caraways, coriander, and cummin.

The northern parts of the northern hemisphere are the chief seats of this remarkable family. In tropical countries it is nearly unknown,

except at considerable elevations, where the climate is that of temperate latitudes. Fifteen hundred species are estimated as its contents, sixty-seven being found in Britain, and thirty of them near Manchester. Few families are beset with so many difficulties. It is an old botanical axiom, that the easier it is to tell the family a plant belongs to, the harder it is to discriminate the species and the genus; and nowhere does that axiom apply more forcibly than in the case of the Umbelliferæ. Most systems of classification begin with the consideration of the ripe fruit; but as our object at present is to discriminate them while in flower, we prefer to make our starting point the Leaf.

A.

Leaves circular, crenate, on stalks three or four inches high, and resembling little tables. Umbels extremely minute, their stalks under an inch in height. (Fig. 179) ..... 1. Marsh Pennywort.

B.

Leaves roundish, cut into about five deep and equal lobes, and very glossy. Stems slender, twelve to eighteen inches high. Umbels small, crowded into heads. Flowers minute, dull white ..... 2. Sanicle.

C.

Leaves oval or triangular in outline, more or less deeply cut into leaflets; generally very much so.

* Leaves pinnate, the leaflets often pinnatifid. General outline of the leaf oval or egg-shaped.

† *Growing on dry land.*

Stems prostrate, a foot long, rough. Umbels simple, lateral, and sessile..... 24. Knotted Burweed.

Stems upright.

Petioles remarkably dilated, so as to form pouches for the buds. (Fig. 174.) Plant two to four feet high, large, coarse, and rough. Leaves composed of three to five large leaflets, the terminal one three-lobed. Outer flowers larger than the inner ones ..... 21. Cow-parsnip.

Petioles not remarkably dilated; leaflets numerous.

Leaflets sessile, and all very much pinnatifid; the lobes narrow, and crossing one another.... 9. Caraway.

All, or many of the leaflets, especially at the base, oval or circular.

Leaflets round, but often deeply pinnatifid; stems slightly furrowed ..... 11. Meadow Pimpinel.

Leaflets egg-shaped, coarsely serrated; the terminal leaflet three-lobed; stem deeply furrowed..... 12. Greater Pimpinel.

†† *Growing in or upon the margin of water.*

Umbels nearly sessile, lateral, four to eight-rayed.
Leaflets regularly and finely serrated ..... 6. Common Marshwort.
Umbels on stalks.
Umbels of rarely more than two rays; leaflets few and minute; plant insignificant, trailing or floating ..... 7. Mudweed.
Umbels of several rays; plant large and conspicuous.
Stem branched; leaves handsome, the leaflets egg-shaped, sharply serrated, and pointed.
Umbels all terminal; rays usually fifteen to twenty. Stem usually three or four feet high. Leaflets equally serrated ..... 14. Broad-leaved Water-parsnip.
Umbels mostly lateral; rays usually ten to fifteen. Stem seldom above two feet high, much branched. Leaflets unequally serrated ..... 13. Narrow-leaved Water-parsnip.
Stem nearly simple, remarkably tubular; umbels of very few rays; leaflets linear, very small; those upon the aërial part of the plant tubular, like the stem ..... 15. Tubular Dropwort.

** Leaves formed of three, five, or seven branches; the branches more or less compound, and the general outline of the leaf triangular.

† Leaflets never exceeding nine, oval and serrated; stem robust. Upper leaves ternate; lower ones twice ternate ..... 8. Goat-weed.

†† Leaflets more than nine, usually very numerous.

‡ Umbel of not more than two or three rays; flowers minute; stems weak, branched, spreading, four to twelve inches long. Bracts of the involucel large, cleft, and upright ..... 25. Shepherds' Needle.

‡‡ Umbel of many, usually numerous rays.
Bracts large and pinnatifid; stem very bristly; central flower of every umbel usually *red* ..... 22. Wild Carrot.
Bracts, when present, undivided.
Stem spotted and sometimes streaked with blackish-purple.
Stem smooth, polished, four to six feet high, slender, much and gracefully branched, and, with the leaves, smelling nauseously when bruised. (Fig. 178) ..... 3. True Hemlock.
Stem eighteen to thirty-six inches high, slender, furrowed, swollen beneath the joints, and rough with short hairs. Young umbels drooping ..... 28. Rough Chervil.

Stem without spots and streaks.
- Petioles immensely dilated (Fig. 174); umbel very large and convex; flowers with a lilac tinge. Stem stout, two to four feet high, furrowed, and tinged with purple ..... 20. Angelica.
- Petioles not remarkably dilated.
  - Juice of the stem yellow. Plant four feet high, stout; umbels convex. Leaves glossy. Roots tuberous ..... 16. Yellow-juiced Dropwort.
  - Juice of the stem colourless.
    - Plant glabrous.
      - Water or water-margin plants.
        1. Leaflets an inch or more in length, lanceolate, serrated. Stem stout and hollow ..... 4. Water Cowbane.
        2. Leaflets large, wedge-shaped, cut and lobed at the extremity. Umbels often sessile and unequal, and either terminal or axillary ..... 5. Wild Celery.
        3. Leaflets very small, numerous, and widely spreading. Roots fibrous 17. Fine-leaved Dropwort.
      - Dry-land plants.
        - Scentless or nearly so.
          - Stem remarkably flexuose at the base. Bracts inconsiderable ..... 10. Earth-nut.
          - Stem not flexuose. Bracts of the umbellules long and pendulous .. 18. Fools'-parsley.
        - Strong-scented.
          - Intolerably fœtid. Segments of the leaves broad and flat ..... 30. Coriander.
          - Aromatic. Segments of the leaves as fine as hair ..... 19. Spignel.
    - Plant, or a portion of it, more or less downy or hairy.
      - Strongly aromatic. Stem thick, succulent, hollow, one or two feet high ..... 29. Sweet Cicely.
      - Scentless, or nearly so. Stem 18 inches high, slender.
        - Flowers tinged with lilac. Umbels on long stalks. Terminal segment of the leaf elongated; stem rough .. 23. Lilac Hedge-parsley.
        - Flowers pure white.
          - Fruit rough. Umbels on rather short stalks; stem glabrous, polished; sheaths and leaves more or less hairy 26. Bur-parsley.
          - Fruit smooth. Umbels on long stalks; umbellules drooping while young; stem glabrous above, more or less hairy below; leaflets shining, ciliated ..... 27. Cow-parsley.

HABITATS AND LOCALITIES.

1. Marsh Pennywort—(*Hydrocótyle vulgáris.*)

Borders of ponds, and in boggy ground, where not occupied by larger plants, common. Plentiful on Hale Moss. Fl. May, June.

Curtis, ii. 383; E. B. xi. 751; Baxter, iii. 168.

The only British plant with "peltate" leaves, and difficult to believe umbelliferous, were it not that the flowers and fruit are conclusive. The delicate and peculiar foliage has procured for it with young ladies the name of "Fairies' tables."

2. Sanicle—(*Sanícula Europæa.*)

In woods, common. Ashley Woods, near Bowdon; Cotterill Clough; Gatley Carrs; Agecroft Clough; Reddish; Bramhall. Fl. May, June.

E. B. i. 98; Baxter, iii. 235.

3. True Hemlock—(*Conium maculátum.*)

Ditch-banks, rather rare. Landside, Pennington, Leigh, and Drywood, Worsley. (J. E.) Occasionally about Stretford, Chorlton, and Reddish. The yard of the farm occupied by the notorious Hendersons, at Bramhall, used to be full of it, and may be so yet. Fl. June, July. Biennial.

Curtis, i. 17; E. B. xvii. 1191; Baxter iv. 303.

The whole plant is poisonous, but modern experience has shewn it to be less violent than was anciently supposed.

The name "hemlock" is popularly applied to many different species of the Umbelliferæ,—perhaps to all the larger and branching kinds with white flowers, just as the name "dandelion" is given indiscriminately to all the common Compositæ of similar figure. It is well, therefore, to distinguish the present as the "True hemlock."

Often grown in gardens.

4. Water Cowbane—(*Cicúta virósa.*)

Ditch-banks and pondsides, rather rare. Pondsides near Bucklow Hill; near Mobberley; on Knutsford Moor; plentiful in pits at Mere; in Foxhill meadows, Barton, plentiful; and between Capesthorne and Congleton, plentiful, growing with the *Ranunculus Lingua.* Fl. July, August.

E. B. vii. 479; Baxter, v. 395.

One of the rankest of our vegetable poisons.

5. Wild Celery—(*Apium gravéolens.*)

In a clough on the south-side of Mellor Church, Derbyshire, plenti-

ful. (Mr. Isaac Williamson.) River banks at Craybrow, Statham, near Lymm. (Mr. Brownell.) Fl. July, August. Biennial.

E. B. xvii. 1210; Baxter, ii. 156.

The origin of the celery cultivated in gardens as a vegetable for the market.

6. Common Marshwort—(*Helosciádium nodiflórum.*)

Pondsides and in wet ditches, not rare. Hale Moss. Ditches by the wayside between Sale and Carrington Moss. Fl. July, August.

E. B. ix. 639; Baxter, vi. 415.

Marshwort, when without flowers, has somewhat the look of water-cresses, in company with which it often grows. It is easily distinguished by its hollow stems, and serrated and pointed leaflets. (See page 118.)

7. Mudweed—(*Helosciádium inundátum.*)

On the muddy borders of ponds, and sometimes floating in the water, common. Victoria Park; Rusholme; Clayton; Bowdon; Rostherne Mere. Fl. May—July. Annual?

E. B. iv. 227 (as *Sison inundatum*).

When floating in water, the leaves are attenuated to the fineness of hair.

8. Goatweed—(*Ægopódium Podagrária.*)

Damp waysides and on the borders of rivers, a remarkably gregarious plant, common. Plentiful about Didsbury. Fl. May, June.

E. B. xiv. 940; Baxter, ii. 151.

9. Caraway—(*Cárum Cárui.*)

Occasionally in cultivated fields, from seeds undesignedly conveyed thither. Fl. June. Biennial.

E. B. xxi. 1503; Baxter, iii. 232.

10. Earth-nut—(*Búnium flexuósum.*)

Dry woods, orchards, hill-sides, hedgebanks, and meadows, abundant everywhere. Fl. May, June.

Curtis, ii. 241 (as *Búnium Bulbocástanum*); E. B. xiv. 988; Baxter, vi. 435. (The real *B. Bulbocástanum* is a different plant. See E. B., Supp. iii. 2862.)

The most delicate of the British Umbelliferæ, both in branch and leaf, and easily distinguished by the bendings of the stem just below the surface of the ground, where it looks as if it had been turned out of its course by little stones. Contrary to what happens in other plants, the stem at this part decreases *downwards*. The round, chesnut-like roots are good to eat, but they lie deep, and are very slenderly attached, so that great care is required in digging them up. Before flowering, the umbels droop.

11. Meadow Pimpinel—(*Pimpinélla Saxifraga.*)

Dry meadows and pastures, common. Plentiful near Arden Hall, upon both sides of the river. Fl. July, August.

E. B. vi. 407; Baxter, vi. 411.

Remarkable for the diversity of its slender and pretty pinnate leaves.

12. Greater Pimpinel—(*Pimpinélla mágna.*)

Long Lane, between Bowdon and Hale. "Near Leigh and near Lymm." (B. G.) Worsley Lane. (J. E.) Fl. July, August.

E. B. vi. 408.

13. Narrow-leaved Water-parsnip—(*Sium angustifólium.*)

Ditches and pondsides, rather rare. Pondsides below Bowdon old Church. Ditches near Baguley old Hall. Knutsford Moor. (Mr. Hunt.) Fl. July, August.

Curtis, iii. 468; E. B. ii. 139.

Resembles the common marshwort, but distinguished by its stalked umbels, and by having bracteas both to the umbels and the umbellules, the umbels being destitute of them in the other plant.

14. Broad-leaved Water-parsnip—(*Sium latifólium.*)

Worsley, Tyldesley, and Culcheth, near Warrington. (J. E.) Fl. July, August.

Curtis, iii. 469; E. B. iii. 204; Baxter, iv. 319.

15. Tubular Dropwort—(*Œnánthe fistulósa.*)

Pondsides, rather rare. Ponds near the "Dog and Partridge," Longford; Boothstown (J. E.); Knutsford; Thornham, near Middleton; and abundant at Bradford, near Clayton. (J. P.) Said to grow also about Reddish. Fl. July, August.

E. B. vi. 363.

16. Yellow-juiced Dropwort—(*Œnánthe crocáta.*)

Ditches, rather rare. Between Pilkington and Ratcliffe. (J. P.) Ditches by the roadside between Bowdon and Rostherne, but now nearly destroyed, through their being cleaned out. Between Heatley and Lymm, near Reddish. Near Bucklow Hill. (Mr. Hunt.) Bank of the Irwell, below Peel Green. Pennington, near Leigh. (J. E.) Fl. July.

Curtis, iv. 599; E. B. xxxiii. 2313; Baxter, ii. 160.

A very poisonous plant, especially to mares and cows.

17. Fine-leaved Dropwort—(*Œnánthe Phellándrium.*)

Ditches and pondsides, rare. Ponds behind the Art-Treasures Exhibition site. Landside, near Leigh, plentiful. (J. E.) Fl. July.

E. B. x. 684.

18. Fools'-parsley—(*Æthúsa Cynápium.*)

Cornfields, waste ground, and neglected kitchen-gardens, unhappily abundant everywhere. Fl. July, August. Annual and biennial.

Curtis, i. 18; E. B. xvii. 1192; Baxter, i. 19.

A poisonous plant, which has caused the deaths of many, through its resemblance to genuine parsley. (See "Walks and Wild-flowers," chap. vi.) When in flower it is distinguishable by the long, pendulous bracts beneath the umbellules; and at other times by the much more attenuated and never crisped or "curled" leaves, which are also of a dark and unpleasant green, while those of genuine parsley have a yellowish tinge. If the curled varieties of parsley were alone to be cultivated, the fools'-parsley could never be confounded with it by dealers and eaters.

19. Spignel—(*Méum Athamánticum.*)

Whiteley Dean, a moor near Milnrow, plentiful. (J. P.) Fl. June, July.

Curtis, iv. 600; E. B. xxxii. 2249; Baxter, iv. 314.

Occasionally in good gardens.

20. Angelica—(*Angélica sylvéstris.*)

Ditch-banks, on the borders of rivulets, and in marshy places, abundant everywhere. Plentiful near Carrington Moss. Fl. July—October.

E. B. xvi. 1128; Baxter, vi. 491.

A handsome though not very tall plant, conspicuous in low wet grounds, and on the borders of streams towards the close of the season, when its splendid convex and lilac-tinged umbels rise above the exhausted relics of the summer, and catch the eye at a long distance.

21. Cow-parsnip—(*Heráclеum Sphondylium.*)

Dry borders of fields, and frequently among mowing-grass, common everywhere. Fl. June, July.

E. B. xiv. 939; Baxter, ii. 130.

Next to the Angelica, the noblest and handsomest of our Umbelliferæ, both in the amplitude of its foliage, and the large flat-topped umbels that surmount it. The flowers are pure white, and the marginal ones usually larger than the inner, giving the umbel that peculiarly elegant and radiant aspect which we see in the

cymes of the wild Guelder-rose. The fruit ripens abundantly, and furnishes a fine example of the "cremocarp." States of the plant with narrow leaves have by some botanists been catalogued as a variety. Cattle eat the herbage as part of their pasture, and it is probably a wholesome and nourishing food for them.

22. Wild Carrot—(*Daucus Caróta.*)

Dry borders of cultivated fields, and on dry waste ground, not uncommon. Fl. July. Biennial.

E. B. xvii. 1174; Baxter, iii. 180.

A tough-stemmed, bristly plant, interesting as the probable origin of our garden carrots, and distinguished by the large pinnatifid bracts of the involucrum; by the central flower of each umbel being usually red instead of white, and neuter; and by the umbel becoming concave as the seeds ripen, and when mature, resembling a little bird's-nest. In autumn the leaves turn purple.

23. Lilac Hedge-parsley—(*Torilis Anthríscus.*)

Hedgebanks, everywhere. Fl. July—October. Annual.

Curtis, ii. 386; E. B. xiv. 987 (both as *Caucalis Anthriscus*); Baxter, v. 347.

A very pretty ornament of our hedgebanks in autumn, when its simple lilac blossoms come out plentifully.

24. Knotted Burweed—(*Torilis nodósa.*)

Spontaneous in a garden near Bury, 1856. Worsley Lane, sparingly. (J. E.) "Astley and near Tyldesley." (B. G.) Fl. May—July. Annual.

E. B. iii. 199 (as *Caucalis nodosa*).

25. Shepherds' Needle—(*Scadix Pecten-Véneris.*)

In clover and cornfields, occasionally. Fl. June, July. Annual.

Curtis, ii. 313; E. B. xx. 1397; Baxter, iv. 272.

26. Bur-parsley—(*Anthríscus vulgáris.*)

Hedgebanks, common, and by field-sides, often forming great forests, and at a distance resembling the foam of the sea. Fl. May, June. Annual.

Curtis, i. 19; E. B. xii. 818 (both as *Scandix Anthriscus*).

27. Cow-parsley—(*Anthríscus sylvéstris.*)

Meadows and hedges, common everywhere, and one of the earliest of the family to come in bloom. Fl. April—June.

Curtis, ii. 242; E. B. xi. 752 (both as *Chærophyllum sylvestre*); Baxter, iii. 228.

A luxurious treat to rabbits, as those who keep these creatures are well aware.

28. Rough Chervil—(*Chærophyllum temulèntum.*)

Hedgebanks and by ditches and waysides, everywhere. Fl. June, July.

Curtis, ii. 388; E. B. xxii. 1521; Baxter, vi. 483.

Often conspicuous in the autumn, through the rich purple hue then assumed by the finely-divided and hairy leaves.

29. Sweet Cicely—(*Myrrhis odoráta.*)

Abundant in the meadows adjacent to every stream of importance in the district, especially in those lying near the Tame, and near the Mersey, about Cheadle. Fl. May, June.

E. B. x. 697 (as *Scandix odorata*); Baxter, v. 374.

Remarkable for its sweet and aromatic odour, whence it is sometimes called "Paregoric." The fruit is remarkably large, an inch long, dark brown, and with deep longitudinal furrows; and the whole plant of a soft and delicate yellowish-green hue.

30. Coriander—(*Coriándrum sativum.*)

In cultivated fields, like the caraway, an occasional visitant. Fl. June. Annual.

E. B. i. 67; Baxter, vi. 504.

Well marked by its globular and pleasantly aromatic fruit.

Bupleurum rotundifolium made its appearance a few years ago in a garden at Middleton; and a season or two afterwards, in James Percival's garden, Hope-square, near Prestwich. How the seeds were conveyed is not known.

The Umbelliferæ are in very few cases considered sufficiently ornamental for the flower-garden. Two or three species of *Eryngo*, with prickly leaves, and dense egg-shaped heads of sessile blueish flowers; as many more of the pretty genus *Astrantia*, the umbels of which are simple and surrounded by large pinkish bracts; and that prodigious plant, the Siberian cow-parsnip, pretty nearly complete the list. The Siberian cow-parsnip is the largest discovered plant of the family, the stem rising eight or ten feet high, and the umbels measuring nearly a yard across. It is now becoming common in gardens, and has been grown in the public parks. Two species are distinguished, the *Heracleum gigánteum*, a biennial, with the umbels somewhat convex; and the *Heracleum Sibiricum*, which is perennial, and has the umbels flat-topped. In the kitchen-garden they are more copiously represented:—Parsley, or *Petroselinum sativum;* Fennel, or *Fœniculum vulgare;* and the parsnip, or *Pastinaca sativa;* along with celery, the carrot, coriander, and the caraway, enumerated in the list of native species, are grown everywhere in less or greater quantity.

CII.—THE ESCALLONIA FAMILY. *Escalloniáceæ.*

A little family of very beautiful evergreen conservatory shrubs, some of which are sufficiently hardy to bear the winter out of doors, if protected during severe weather. They come chiefly from South America. Leaves alternate, toothed, exstipulate, resinously glandular, and often with a powerful odour. Flowers axillary, or in panicles, conspicuous, their parts in fives; fruit capsular. The last character is almost the only one by which they are distinguished from the Grossulaceæ. The species most usually grown is the *Escallonia rubra.*

CIII.—THE WHINBERRY FAMILY. *Vacciniáceæ.*

Shrubs or small trees, frequently evergreen, usually much branched and low-growing. Leaves alternate, undivided, more or less oval.

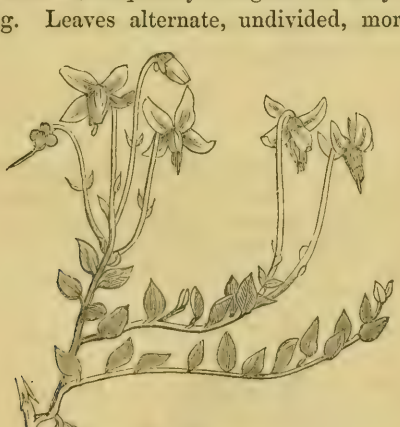


Fig. 180.
Cranberry.

Flowers solitary or in racemes. Calyx and corolla four to six-lobed, the latter usually ovate or bell-shaped; stamens twice as many as the lobes, the anthers opening by pores at the end like those of the Heath Family (p. 127). Ovary beneath the flower, ripening into a globular berry, which is crowned by the permanent calyx. This is almost the only character by which the family is distinguished from the *Ericaceæ.* Many authors do not keep them apart.

The species abound in all the temperate parts of the world, especially in swampy and subalpine districts. The bark and leaves are astringent; the fruit is sub-acid, and pleasant to eat when cooked. Cranberries, bilberries, and whortleberries, or whinberries, are well known and valuable in the latter respect; while many others form pretty shrubs for garden ornament. Four grow wild in England, and three of them near Manchester.

A.

Corolla bell-shaped or urn-shaped.

1. Flowers solitary in the axils of the leaves. Leaves ovate, pointed, with little teeth, nearly sessile, and deciduous. Stems numerous, branched, very angular, six to fourteen inches high. Corolla nearly globular, greenish-red. Berry nearly black ..... } WHINBERRY or WHORTLEBERRY.

2. Flowers several together, pale flesh-colour, in short, dense, terminal, drooping racemes. Leaves obovate, resembling those of the box-tree and evergreen. Stem much branched, procumbent, and straggling. Berries red..... } COWBERRY.

B.

Corolla deeply divided into four lobes, which are bent back, so as to expose the stamens.

3. Stems prostrate, as fine as horse-hair, ten to twenty inches long, growing in dense matted tufts. Leaves oval, minute, entire, evergreen, gray underneath. Peduncles terminal, one-flowered, the flowers not more than two or three inches above the ground, and of a beautiful bright rose-colour. Berries red. (Fig. 180.)..... } CRANBERRY.

HABITATS AND LOCALITIES.

1. WHINBERRY or WHORTLEBERRY—(*Vaccinium Myrtillus.*)

Moors, heaths, mountains, and dry woods, everywhere. One of the principal plants of the hills where sportsmen go for grouse. Plentiful on Alderley Edge, and in Mere Clough. Fl. April, May. Berries ripe in July.

E. B. vii. 456.

The berries are the "whimberries" of the market-place.

2. COWBERRY—(*Vaccinium Vitis-Idæa.*)

On all the hills where sportsmen go. Abundant on Kinder Scout, Fo-edge, Cobden Edge, and on Ashworth Moor, above the fir-wood, looking over Summerseat. Fl. May, June.

E. B. ix. 598; Baxter, v. 383.

The berries are often collected with those of the next species, and mistakenly sold for them.

3. Cranberry—(*Vaccínium Oxycóccos.*)

On all the mosses about Manchester, common. Barton Moss; Carrington Moss; Horwich Moor; Lindow Common. Fl. May, June.

E. B. v. 319; Baxter, vi. 429.

Some botanists regard those *Vacciniums* which have a reflexed corolla as a separate genus, and call the English one *Oxycoccos palustris.*

CIV.—THE IVY FAMILY. *Araliáceæ.*

The Ivy Family is known to ordinary botany only in the evergreen climber which gives name to it, and in a tiny spring blossom of the hedgebanks, as little like ivy in general figure as could well be con-

Fig. 181.
Stem, leaves, and hold-fasts of Ivy.

ceived. There are about one hundred and fifty species in all, distributed pretty generally over the world, and in their technical characters approaching the Umbelliferæ, from which they differ in the ovary having more than two cells, and in the tendency to form a

woody stem. The two plants adverted to are the only British examples, and both are found near Manchester.

1. An evergreen shrub, with numerous slender and flexible branches, plentifully clothed with shining foliage, and yielding, when bruised, a strong and peculiar smell. Sometimes it trails weakly upon the ground, and has small, angular, three or five-lobed leaves, which are often prettily variegated. At other times it ascends trees, rocks, or buildings, climbing to a great height by means of root-like suckers, which are thrown out abundantly at the sides of the stems. (Fig. 181.) As soon as it has reached the top of its support, the stems shorten, and become woody, forming large bushy heads, and producing flowers and fruit. The leaves are now in scarcely a single instance angular, but ovate, retaining, however, the characteristic gloss, and with long petioles. The flowers are borne in a short raceme of nearly globular umbels; the petals five, broad and short, and seated, with the five stamens, on the large round ovary, which becomes a black berry, containing two to five seeds ..... COMMON IVY.

2. A delicate herbaceous plant; radical leaves, on long stalks, twice or thrice ternate, with broad, deeply three-lobed segments; upper leaves only two, on short stalks, and simply ternate; stem solitary, three or four inches high, with five little green flowers in a terminal head, one looking right up to the zenith, and the others placed back to back and directed to the four points of the compass, like the four dials of many public clocks. The terminal flower has four petals and eight stamens; the lateral ones have five petals and ten stamens. Root-stalk covered with imbricated white scales, the remains of old leaf-stalks ..... MUSK-ROOT.

HABITATS AND LOCALITIES.

1. COMMON IVY—(*Hedera Helix.*)

Common everywhere, creeping on the ground in woods and upon hedgebanks; running up young trees, like a vegetable centipede, and forming large bushes in the upper portion, and if the boughs spread horizontally over banks of rivers, sitting upon them, balanced elegantly, like birds; at other times mantling rocks and buildings with a permanent and adhesive tapestry.

> "Creeping where no life is seen,
> A rare old plant is the ivy green."

The finest ivy-tree I am aware of, in this neighbourhood, clambers

over the outbuildings at Damhead Farm, Mobberley. Fl. late in autumn; the berries ripe in spring, when they are common in rustic posies.

Curtis, i. 16; E. B. xviii. 1267; Baxter, i. 32.

Ivy is not a parasite, as commonly supposed, but has its roots in the earth, and simply adheres to the trees or other props by which it is elevated into the air. It is only upon the unsupported branches that flowers and fruit ever occur; if the stem have suckers upon it, there are neither. "Irish Ivy," and several other beautiful varieties, are occasionally planted against garden walls. Mr. Sidebotham has a very pretty collection of them.

2. Musk-root—(*Adóxa Moschatéllina.*)

Damp and shady hedgebanks, and in moist woods, common. Abundant about Ashton-upon-Mersey. Fl. April.

Curtis, i. 99; E. B. vii. 453; Baxter, i. 42.

Some authors place this plant in the Honeysuckle Family, to which both it and the ivy approach as regards their flowers.

CV.—THE MISTLETOE FAMILY. *Loranthàceæ.*

Shrubs, to the number of four hundred species or more, in almost every case growing into the tissue of other plants as true *parasites.* (See pages 163, 212, 231.) Near Manchester, and perhaps in England generally, they are known in the living state only in the typical species, the common mistletoe used for Christmas decorations, which in habit gives an idea of all. The only conspicuous difference in the foreign kinds is that the flowers are often scarlet, orange-coloured, or of some other brilliant tint. They belong chiefly to the equinoctial regions of America and Asia, and are noted for the astringency of their bark, and for the viscidity of their berries.

Mistletoe is a shrubby perennial, with yellowish-green, repeatedly forked, jointed, round, somewhat succulent branches, clothed with narrow oblong, opposite, entire, obtuse, and leathery leaves, and forming dense bushes, which attain a diameter of two to four or five feet. The stems, which become woody when old, are attached by a thickened base to the branches of trees, drawing sustenance from them, and of course inflicting serious injury. The flowers are small, almost sessile, in the forks of the branches, greenish yellow, and unisexual, some plants bearing only male blossoms, others only female ones. The males grow three to five together, and have four short, thick, triangular petals, and four stamens; the females are solitary, or nearly

so, their petals very minute, and followed by white, semi-transparent berries, the size of a large pea, and composed of sticky pulp, enclosing a solitary seed. The gleam of the white berries, which are as pearls to the red coral of the holly, is one of the most striking features of this curious production.

HABITATS AND LOCALITIES.

COMMON MISTLETOE—(*Viscum album.*)

On apple-trees in gardens and orchards at Lymm; Warburton; Atherton, near Leigh. (J. E.) Prestwich (also on hawthorns), Knutsford, Baguley, and elsewhere, but very sparingly, and generally out of public view, or Christmas thieves would have destroyed what little there is. Fl. April, May.

E. B. xxi. 1470; Baxter, i. 40.

The mistletoe sold in the market is brought from the southern counties, and chiefly from Worcestershire and Herefordshire. The plant is one of those which fancy and superstition have fixed upon as the "forbidden fruit." That may account for its being turned, in these degenerate days, once a year at least, into the tree of privilege!

CVI.—THE DOGWOOD FAMILY. *Cornáceæ.*

An inconsiderable family of shrubs, and a few herbaceous plants, with two native species, but near Manchester known only in gardens. The common dogwoods are shrubs, with rather large, oval, acuminate, and entire leaves; cymes of small white tetramerous flowers, with four stamens, and seated upon the summit of the ovary. They generally have red twigs, and as would naturally be expected of *dog*woods, are thus partly indicated by their bark. The carnelian cherry, or *Cornus mascula*, produces its abundant little yellow flowers in February and March, or before the leaves, the cymes being surrounded by an involucre. To this family belongs also the "spotted laurel," or *Aúcuba Japónica*, the large oval yellow-blotched leaves of which render it a great and popular ornament of every garden. The minute reddish-brown and unisexual flowers appear in May, but quite concealed among the foliage. None but female plants of the *Aúcuba* occur near Manchester, or anywhere, I believe, in Europe.

CVII.—THE BIRTHWORT FAMILY. *Aristolochiáceæ.*

A little family of singular plants, difficult to associate with any other. They are exogenous in the main points of their structure, but like the Berbery (p. 150), resemble Endogens in the trimerous division of their flowers, and in some respects in habit. Some are herbaceous, others shrubby, while a good many have twining stems. Leaves alternate, simple, and stalked; flowers axillary, solitary, brown, yellowish, or of some dull colour, and consisting of a tubular calyx only; stamens six to twelve; ovary below the flower, usually six-celled.

Equinoctial South America is the chief station of these plants, very few species occurring in the north, and two only in Great Britain. These are the common birthwort, or *Aristolóchia Clematitis*, (Curtis, iv. 639.) and the asarabacca, or *Asarum Europæum*, (E. B. xvi. 1083.) both of old repute in medicine, and cultivated in gardens by the curious. Birthwort has erect, zigzag, unbranched leafy stems, about two feet high; rather large, broadly heart-shaped leaves (Fig. 182),

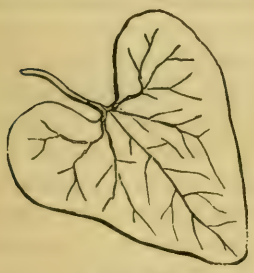


Fig. 182.

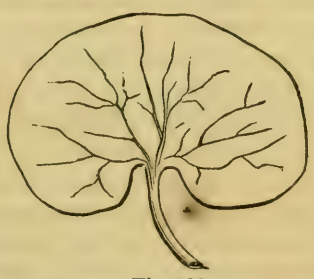


Fig. 183.

and long, slender, curved, horn-like, pale yellow flowers, several in the axil of each leaf. Asarabacca has very short stems; the leaves nearly radical, kidney-shaped (Fig. 183), shining, on long stalks, two on each stem, and a good deal tufted, with a solitary, greenish-brown, bell-shaped flower, about half an inch long, accompanying each pair of leaves, and upon so short a peduncle as to be entirely concealed. The leaves vary from an inch in breadth to as much as three inches.

Several species of *Aristolóchia* are cultivated in green-houses, but none are common plants.

SECTION 2.—UNISEXUAL EXOGENS.

CVIII.—THE CUCUMBER FAMILY. *Cucurbitáceæ.*

An important and interesting, though not extensive family, belonging chiefly to the tropics, and to India in particular. The species are uniformly herbaceous, with very long, weak, and succulent stems, that climb by means of powerful tendrils when trees or shrubs are near to give them support, but otherwise run along the ground. Leaves large, alternate, petiolate, simple, fan-veined, fan-lobed or palmate, succulent, and rough with tubercles. Flowers pentamerous, regular, and unisexual, the petals more or less united, strongly marked with netted veins, usually large and yellow, sometimes green and inconspicuous, and occasionally fringed. In some species the male and female flowers grow upon different individuals, but in most kinds they are seated upon the same, and in either case are remarkably fine examples of the unisexual structure. The males have five stamens, with large and often beautifully sinuous anthers; the females have three large lobed and velvety or fringed stigmas. The fruit is succulent and three-celled, and in most cases enormous for the size of the plant; the seeds, immersed in the pulp, are usually broad and flat. In habit, foliage, and tendrils, these handsome plants are strikingly like the passion-flowers; the separation of the stamens and pistils, and the position of the ovary, alone keep them asunder. No plants grow more rapidly, or cover an equal space of ground, in so short a time. In regard to properties and secretions, the Cucurbitaceæ are upon the whole to be considered acrimonious; for although excellent fruits are yielded by certain species, as the melon, the cucumber, and the vegetable-marrow, others, such as the colocynth and the elaterium, afford catharties of great energy; and there is good reason to believe that even the former owe their freedom from poisonous principles to cultivation. Besides the three first mentioned, there are grown in gardens curious varieties of the pumpkin and the gourd; and in greenhouses the *Trichosanthes anguina*, the fruit of which is three or four feet long, but not much thicker than the thumb, and called the "snake-gourd." The cucumber and melon belong to the genus *Cucumis;* the vegetable-marrow, the pumpkin, and the gourd, to the genus *Cucurbita.*

One of this family grows wild in England, and belongs to the indigenous Manchester Flora: a plant with a large tuberous and perennial root, and abundance of slender annual stems that climb by means of their tendrils to the height of several yards; the rough and dark green leaves more or less deeply divided into five or seven broad, angular, and coarsely-toothed lobes, the middle lobe longer than the others. The flowers are on separate plants, star-like, pale yellowish green, and growing in loose clusters of two to five or six. The females are succeeded in autumn by globular red berries, the size of a pea.

HABITATS AND LOCALITIES.

COMMON BRYONY—(*Bryónia dioica.*)

Hedges about Sale, Carrington, Didsbury, and Northen, but rather sparingly. Beyond Ashley. Between Altrincham and Broadheath. Near Kenyon and Pennington. (J. E.) Between Mobberley and Knutsford. (Mr. Holland.) Fl. June, July.

E. B. vii. 439; Baxter, ii. 83.

The bryony is one of the most elegant of our native plants. It is very commonly confounded with the famous mandrake, or *Mandragora vernalis*, the root being much of the same figure and dimensions. But the latter, instead of being a tendrilled climber, is a low-growing plant, with the aspect more of a primrose than a cucumber, and with bell-shaped flowers like those of the *Atropa*, or deadly-nightshade.

CIX.—THE BEGONIA FAMILY. *Begoniáceæ.*

A little family of succulent undershrubby plants, natives of the East and West Indies, South America, and the island of Madagascar. They are esteemed for the extreme elegance and singularity alike of their foliage and their flowers, and are conspicuous ornaments of every good conservatory. Leaves alternate, simple, petiolate, usually undivided, and for the most part remarkably oblique, or larger upon one side of the midrib than upon the other, from which circumstance the species that shew it well are by some people called "elephant's-ears." They are generally toothed, rarely entire, often of a deep red colour underneath, and frequently ornamented above with beautiful light spots or other markings. The flowers consist in general only of a calyx, which is petaloid in texture, and usually pink or white, the buds being remarkably flat before expansion. The stamens and pistils are always in separate blossoms, but not upon separate individuals. The inflorescence

is strikingly beautiful, consisting of large, light, loose, and pendulous corymbs, with the flowers hanging like beads at the ends of the slender and repeatedly-divided peduncles. The male flowers are composed of four sepals, two of them smaller than the others, with a dense tuft of club-shaped yellow stamens in the centre; the females consist of five or more, enclosing three large, two-lobed and sessile stigmas, of a rich gold colour, and surmounting a large triangular ovary of the same satiny lustre as the blossoms, and with its edges extended into wings. The fruit is a three-celled and many-seeded capsule, the wings at the angles persistent and enlarged. These particulars shew the affinity of the Begonias to be chiefly with the Cucurbitaceæ, which family they also agree with in their splendid illustrations of unisexual flowers. In their native countries, the affinity is further illustrated by certain species which scramble up the trees.

The finest kinds met with in hothouses are the *Begonia argyrostigma*, the leaves of which appear strewn with seed-pearl, like those of the *Sonerila;* the *Begonia ciliaris*, which has them adorned on the under surface with red fringes, that extend even to the petioles; and the *Begonia Rex*, in which the leaves are spanned by broad and shining silvery arches. Besides these, there are the *parvifolia*, *zebrina*, *picta*, and *splendida*, the yellowish-flowered *xanthina* and *argentea*, and the palmate-leaved *ricinifolia*.

CX.—THE PITCHER-PLANT FAMILY. *Nepenthaceæ.*

There are a few plants in the world of such extraordinary conformation that they cannot be associated with any others, and stand as little families by themselves. Such is the case with the ten or twenty species of *Nepenthes*, or pitcher-plant, inhabitants of the swamps of China and the East Indies, and represented in our hothouses by the *Nepenthes distillatoria*. The stems of this wonderful plant are long, slender, branched, scrambling by the aid of the branches of trees or other props to the height of three or four yards above the ground, and provided with abundance of green leaves, every one of which bears a little pitcher at the extremity. The leaf, pitcher included, is, in its entire length, something over a foot. It commences as a round and cord-like stalk, three to four inches long, and generally twisted and curled like a tendril. Then, for four or five inches, it is broad

and flat, tapering to each end, and in substance thick and leathery. After this, it changes again, distending itself into a tubular cup, deep, long, and wide enough to admit the finger; and lastly, there is a circular lid, the size of a sixpence, articulated to the edge of the cup by a delicate hinge, like the cover of a hot-water jug, and shut down close upon it, or lifted away, according to circumstances. This lid-like appendage alone is the actual leaf; the lower portion, flat part and pitcher included, being only petiole. The twisting and curling of the latter at the base serves to keep the pitcher upright, and thus prevent the watery fluid, with which it is usually half-filled, from running out. The flowers, which are green and unattractive, grow in spikes about as long as the leaves. The pitcher-plant is not of very common occurrence, but may be seen under the cupola of the conservatory at the Botanic Gardens.

CXI.—THE NETTLE FAMILY. *Urticáceæ.*

The plants which compose the Nettle Family are very fairly represented in the unsightly and ill-natured weed from which it is named. With the exception of a few tropical species, which attain the stature of trees, they are low-growing and obscure, seldom above two or three

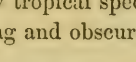


Fig. 184.
Flower of Pellitory (magnified).

feet high, usually covered either with stinging hairs or with asperities, and bearing minute and unattractive green flowers. The leaves are opposite or alternate, usually petiolate, simple or a little divided, serrate or entire. The inflorescence is various; the flowers, which consist of calyx only, are tetramerous, and generally unisexual, the males having four stamens, opposite the sepals, and the females a solitary and superior ovary, containing a solitary and erect ovule. The stigma is fringed, and usually sessile; the fruit is a dry, flattened, seed-like achenium, covered by the permanent calyx, and with the embryo straight, and enclosed in fleshy albumen. It is this last character that essentially distinguishes the Urticaceæ from the Che-

nopodeæ, which in many points they closely resemble, the embryo in the Chenopodeæ being *curved*.

The chief characteristic of these plants is the causticity of the limpid juice of many species, well known in the painful stings of the common nettle. In certain Indian kinds the poison is so strong as to affect the whole arm, and extend even to the body. Some, however, are destitute of stings, and then they are merely insignificant. The stalks often contain abundance of strong fibre resembling hemp, and the boiled herbage is in some cases good to eat. No plants are more widely dispersed, the family being found everywhere, from the poles to the equator, and in all varieties of habitats. Many species follow the footsteps of man, flourishing by the waysides and on the heaps of rubbish near his dwellings.

Four species are indigenous to our island, some authors adding a fifth. Three of them occur near Manchester.

A.—*Plant covered with virulent stings.*

1. Stems two or three feet high, more or less downy; principal leaves opposite, stalked, heart-shaped, somewhat ovate, coarsely serrate, pointed, and rough. Flowers in axillary, branched, and spreading racemes, the latter about the length of the leaves, green, and very numerous, the males not in the same cluster as the females ..... } Common Nettle.

2. Stems seldom more than twelve inches high, branched, and glabrous, with the exception of the stinging hairs. Leaves ovate or elliptical, stalked, deeply and regularly serrate. Flowers in small, loose, axillary, almost sessile clusters, the males mostly at the apex, and the females at the base ..... } Dwarf Nettle.

B.—*Plant destitute of stings.*

3. Stems numerous, diffuse, six to twelve inches long, more or less downy. Leaves alternate, ovate or oblong, stalked, quite entire. Flowers in sessile clusters, reddish and minute; the stamens elastic. (Fig. 184) ..... } Pellitory.

HABITATS AND LOCALITIES.

1. Common Nettle—(*Urtica dioica.*)

Everywhere by waysides and in waste places, as difficult to expel as it is unpleasant to lay hands upon. Fl. summer.

Curtis, ii. 433; E. B. xxv. 1750; Baxter, iv. 298.

2. Dwarf Nettle—(*Urtica urens.*)

Waysides, common, but not like the larger one, universal. Plentiful

about Chorlton, Stretford, Broadheath, Prestwich, &c. Fl. summer. Annual.

Curtis, ii. 434; E. B. xviii. 1236.

3. PELLITORY—(*Parietária officinális.*)

Dry banks in lanes, and on old walls, rather uncommon. Below Bowdon old Church. Farm-house wall between Sale and Carrington Moss. Dirty pig-stye walls about Mobberley, and under the yew hedge at Mobberley old Hall. Near Stretford. Chaddock Lane, and elsewhere thereabouts. (J. E.) Fl. summer.

Curtis, ii. 283; E. B. xiii. 879; Baxter, iii. 224.

The structure of the flowers is remarkably curious. For an account of it, see Curtis.

Being plants usually of no beauty, nettles and their kindred are little cared for by the gardener. The *Urtica pilulifera*, or Roman nettle, (E. B. ii. 148.) and the *Urtica Dodartii*, are grown sometimes as curiosities; and in green-houses is sometimes seen the *Urtica biloba*, admired for its beautifully reticulated leaves, which are cleft nearly in two.

CXII.—THE HEMP FAMILY. *Cannabináceæ.*

One of the smallest families in nature, being composed, so far as hitherto discovered, only of the common hop and the common hemp. The narcotic properties of the former, and the invaluable fibre yielded by the stems of the latter, along with the great beauty of the two plants, give it an importance, however, unlikely ever to be gained by many others which in compass and complexity exceed it twenty-fold. Authors, in general, combine this family with the Urticaceæ: but there the ovule is erect, and the embryo straight and albuminous; while in the present, the ovule is pendulous, and the embryo *ex*albuminous, and hooked or spirally coiled.

The hemp-plant, or *Cannabis sativa*, is an elegant annual, indigenous to the cooler parts of India, and often cultivated in gardens as a curiosity. The stems rise three to six feet high. The leaves are quinate or septate, petiolate, dark green, rough, and half pendulous; the lobes lanceolate, three or four inches long, serrate, and acuminate. The male flowers grow in long, upright racemes; the females (on different individuals) are axillary and sessile. In both sexes they are

green and unpretending, though the males are rendered beautiful by their large anthers. The whole plant has a peculiar and penetrating odour, which may be perceived even without bruising it.

The hop, or *Humulus Lupulus*, a native of all the northern parts of the old world, is one of the most beautiful plants our country produces. The stems are slender and twining, often ascending to a distance of many yards in friendly hedges, and with their surface made rough by minute prickles. The leaves are opposite, some of them elegantly heart-shaped and undivided, the remainder three or five lobed, and as many inches across, very rough, puckered, and supported on long petioles. The male flowers, like those of the hemp, are pentamerous, five-stamened, green, and borne in large, light, branching panicles; the females are clustered into little egg-shaped or oval spikes, in form resembling fir-cones, and composed of numerous broad, concave, and closely-packed scales, each with two minute and sessile blossoms in its axil. The scales composing these coniform spikes are sprinkled over their inner surface, near the base, with resinous glands of a bright yellow tint. When overblown, the glands become loose and roll away. The microscope shews similar glands upon the under side of the leaves.

The hop is not only indigenous, but a plant of the Manchester Flora.

HABITATS AND LOCALITIES.

Common Hop—(*Humulus Lupulus.*)

Hedges at Chorlton, Ashton-upon-Mersey, Ashley, Rostherne, Lymm, &c., abundant, and well nigh smothering the brambles and roses. Pendleton, near the coal pits; Barton fields. (J. S.) Fl. end of summer. Root perennial; stems annual.

E. B. vi. 427; Baxter, v. 342.

Some believe the hop to be an introduced plant, but there is little doubt of its being a veritable ancient Briton, rendered more general by cultivation. Nothing can be more beautiful than its vine-like wreaths, as we see them in September festooning the tall and untrimmed hedges of the country, and hung with the pale green tassels of the female flowers, or the light feathery panicles of the males, that shed clouds of yellow pollen with the slightest touch. No plant makes a more charming pyramid for a garden, or drapery for a trellis, where its branches can float idly in the air.

CXIII.—THE BOX-TREE FAMILY. *Euphorbiáceæ.*

The Euphorbiaceæ rank with the largest and most important families of which botanists have knowledge, the number of species probably amounting to not less than two thousand five hundred, and a very considerable proportion being possessed of intensely active properties, that have given them celebrity, both in medicine and as poisons. Few, however, come before the English student, the mass of the family being tropical, and only one here and there sufficiently beautiful to excite the interest or even the notice of the gardener. About three-

Fig. 185.
Caper Spurge.

eighths of the species hitherto discovered have been found in equinoctial America; the warmer parts of Africa contain the next largest proportion, while in Europe there are scarcely more than one hundred and twenty, and in temperate North America not half as many. No family is more diversified in aspect. Trees, shrubs, stout and milky herbs, diminutive green weeds, and deformed and leafless plants resembling cactuses, represent it in different countries and different zones, rendering a just idea of the family quite impossible, so long as

the attention is confined to the few stragglers in our own island. The genera of these latter differ, moreover, so much among themselves, that save for the links supplied by foreign ones, even their own connection might be doubted. Notwithstanding these diversities, no family, taken as a whole, admits of being characterized in fewer words;—the flowers are unisexual, and the fruit is in almost all cases a three-celled capsule, the cells containing each a solitary seed, and when ripe, opening elastically and falling apart. No where else are the peculiarities in question found together, so that despite the endless variety of general figure, a Euphorbiaceous plant is still determined with facility. It is somewhat odd that the few exceptions which do occur, should await us among the very first species usually encountered, viz: in the mercury, the fruit of which is only two-celled, and in the box-tree, the cells of which are two-seeded. It happens further, that in the ordinary genera the flowers are singularly incomplete, and that in the true Euphorbias,—the commonest genus of all, and the most numerously represented,—they are reduced to the lowest possible condition. Fortunately the great family characters are conspicuous in this curious genus, and if the student takes care to think of it only as the lowest extreme, he is safe in taking it as the basis of his ideas. The leaves of the Euphorbiaceæ are either opposite or alternate, simple or occasionally divided, and usually glabrous. The inflorescence is various. Some species have axillary, and more or less sessile flowers; in others they are clustered in spikes, or in terminal cymes or umbels. The flowers, whether incomplete or fully developed, are always inconspicuous, though often surrounded by large and handsome petaloid bracts, which compensate the deficiencies of the nobler parts. The stamens are usually few. All the English species are more or less poisonous, and there are many kinds in foreign countries, such as the manchineel, which almost realize the famous fable of the upas. Castor-oil is expressed from the seeds of the *Ricinus communis*, a tree abundant in the hotter parts of the eastern hemisphere. Tapioca is obtained from the roots of a Brazilian plant called *Jatropha*, poisonous before exposed to the action of heat; and bottle india-rubber from the stems of the *Siphonia elastica*. The caustic milky juice of the Euphorbias, even of our own country, is reported strong enough to destroy warts.

Eighteen species grow wild in England, fifteen of them being spurges or true Euphorbias, and four out of the eighteen occurring near Manchester.

A.—*Leaves opposite.*

1. Leaves ovate, two or three inches long, stalked, serrate, pointed, rough, rather crowded at the upper part of the stems, which are erect, nine to twelve inches high, and unbranched. Flowers trimerous, consisting of calyx only, the males yellowish, with nine stamens, and collected in little slender upright interrupted spikes, rising from the axils of the upper leaves; the females greenish, on separate plants, one or two together, axillary, and nearly sessile till after blooming. Ovaries two ..... } Common Mercury.

B.—*Leaves alternate or scattered.*

Flowering branches axillary, the upper ones forming a terminal umbel of three to five or more long rays, every branch usually forked several times, with a pair of green bracts at the base of every fork, and a small green flower-head in the inner angle. These flower-heads consist of an involucre of little bracts, resembling a perianth, and provided with four or five small teeth, alternating with as many yellowish glands. Within are ten or fifteen stamens, each with a jointed filament, shewing that each is a distinct male blossom; and in the centre of all, a single female blossom, consisting of a three-celled ovary, surmounted by a three-cleft style, and supported upon a stalk which carries it beyond the margin of the involucre, over which it hangs down. Neither male nor female flowers have any perianth. Stems three to twelve inches high. (In some species of Euphorbia the stamens and pistils are in separate flowers, and the stalk of the ovary is straight.)

* Glands of the involucre rounded on the outer edge.

2. Umbel of about five principal branches. Leaves obovate, very obtuse, finely serrate ..... } Sun Spurge.

** Glands of the involucre crescent-shaped, the two horns turned outwards.
Umbel of about three principal branches.

3. Stem leaves linear; stem branched at the base ..... } Dwarf Spurge.

4. Leaves broadly ovate. Umbel large. Horns of the involucre very long ..... } Horned Spurge.

HABITATS AND LOCALITIES.

1. Common Mercury—(*Mercuriàlis perénnis.*)

Shady hedgebanks, and among trees and bushes, very common everywhere, flowering early in the spring, before the leaves are fully expanded.

Curtis, i. 138; E. B. xxvi. 1872; Baxter, ii. 143.

An unpleasantly scented, ill-favoured, and very poisonous plant.

2. Sun Spurge—(*Euphórbia helioscópia.*)

Waste and cultivated ground, especially in potato fields. Fl. July —September. Annual.

Curtis, i. 36; E. B. xiii. 883; Baxter, v. 368.

Called "churn-stuff" about Lymm.

3. Dwarf Spurge—(*Euphórbia exigua.*)

Cornfields on a light soil, rare. Ashley. Prestwich. Marple Vale, abundant in fields near the river, about a mile on the Stockport side of the village. About Leigh, but sparingly. (J. E.) Fl. July. Annual.

Curtis, ii. 256; E. B. xix. 1336.

4. Horned Spurge—(*Euphórbia Peplus.*)

Waste and cultivated ground, especially in ill-weeded kitchen gardens. Common at Bowdon and Lymm. Fl. July, August. Annual.

Curtis, i. 35; E. B. xiv. 959.

Two Euphorbias are commonly grown in gardens, the "caper spurge" and the "cypress spurge," both reckoned indigenous, the former, botanically called *Euphorbia Lathyris*, (E. B. xxxii. 2255.) is a stout, bushy biennial, three or four feet high, and very smooth and glaucous in every part. The leaves are narrow oblong, the upper ones broader, especially at the base, measuring three or four inches in length, opposite instead of alternate, as in others of the genus, and disposed in four vertical rows up the stem. The umbels are composed of three or four long rays; the seed-capsules are large and smooth. (Fig. 185.) The cypress spurge or *Euphorbia Cyparissias*, (E. B. xii. 840.) is by no means so handsome a plant. The stems are numerous, ten to fourteen inches high, densely clothed with smooth, entire, linear leaves; the umbels of many principal branches, with several scattered peduncles below, and along with the foliage, of a yellow hue. The flowers are monœcious. A few other species of the family occur in hot-houses, especially the *Euphorbia splendens*, a low-growing plant with stiff thick stems, covered over the whole surface with long sharp thorns, and bearing at the summit a few light-green oval leaves, and a cyme of brilliant vermilion blossoms, the colour of which resides in the two-leaved involucre. Next in frequency come the *Euphórbia Jacquiniflóra*, the scarlet racemes of which, intermingled with dark-green lanceolate and pendulous leaves, appear at Christmas; and the *Poinséttia pulchérrima*, remarkable for the gorgeous tuft of large red leaves which crowns the stem, and makes us forget the insignificance of the actual blossoms. Destitute of the intense colour of these shewy plants, but quite as pretty in their own way, are the different species of *Xylóphylla* and *Phyllánthus*, the little yellowish blossoms of which come out abundantly along the edges of flattened branches that in the handsomer kinds resemble great pinnate leaves. In good green-houses there are likewise *Crotons* of different kinds, conspicuous in their variegated and painted foliage. Such are the *Croton pictum*, *variegatum*,

and *discolor*. The common Box-tree or *Buxus sempervirens*, (E. B. xix. 1341.) is an excellent example of the family in regard to its three-celled fruit and unisexual flowers, which are produced copiously in early spring; and no less so in the strongly poisonous quality of the deep green and perennial foliage. The perianth is single and tetramerous; the male flower is four-stamened; the seeds are black and shining. The box used for the edgings of flower-borders is a dwarfed variety, never seen in blossom.

CXIV.—THE WATER-HORNWORT FAMILY. *Ceratophyllàceæ.*

A family consisting, so far as at present known, of half-a-dozen insignificant aquatics, which live wholly submerged in the water. They have a very wide distribution, being found in almost all parts of the northern hemisphere, but are of no discovered use. Two species are reputed wild in England; one of which is found near Manchester, and the other probably no more than a variety. The Manchester plant, or common water-hornwort, is a glabrous perennial, with stems that float like those of the water feather-weed (p. 284), and are densely clothed with leaves whorled in the same manner; but instead of being pectinated, twice or thrice forked, the divisions 1—2 in. long, slender, cellular, and rigid. The minute green flowers are sessile in the axils of the leaves, and consist only of a few bracts, the male ones bearing twelve to twenty sessile anthers, the females a small and simple ovary, containing a single seed.

HABITATS AND LOCALITIES.

COMMON WATER-HORNWORT—(*Ceratophyllum demersum.*)

Stagnant waters, ditches, and fish-ponds. "Worsley, Mr. John Martin." (B. G.) Probably not rare. Fl. summer, but very seldom.

E. B. xiv. 947; Baxter, iv. 260. The other form of the plant, or *C. submersum*, is figured in E. B. x. 679.

CXV.—THE CROWBERRY FAMILY. *Empetràceæ.*

The Empetraceæ are small, dry, heath-like and evergreen shrubs, of not more than five or six species altogether, and in technical character not very different from the box-tree family. Only one of them is of interest, and that not so much on account of its beauty, as from its value upon the moors, where its fruit is of great service to grouse and other mountain birds. The stems trail close upon the ground, forming

thickly-branched and matted tufts, twelve to eighteen or twenty inches in diameter. The leaves are narrow linear, crowded, and dark green, with their edges so much rolled back as almost to meet. The flowers are minute, unisexual, and seated in the axils of the upper leaves. They consist of six little scales placed in two rows, with six smaller ones external to them, the males containing three stamens with large purple anthers, on long filaments that bring them plainly into view, and the females a solitary ovary, with six or more radiating stigmas. The fruit is a globular black berry the size of a pea, and contains six to nine triangular seeds arranged in a circle.

HABITATS AND LOCALITIES.

CROWBERRY—(*Empétrum nigrum.*)

On all the hilly moorlands in the district, plentiful. Found also upon the borders of the mosses. Carrington Moss. Fl. May; berries ripe in August.

E. B. viii. 526; Baxter, vi. 469.

CXVI.—THE OAK FAMILY. *Corylácea.*

The Oak Family leads the way to a large assemblage of trees and shrubs which are among the noblest and most beautiful in nature. By many botanists they are collected together under a single name, and called the *Amentaceæ* or "catkin bearers." But there are important differences, both in the veining and the figure of the leaves, and in the structure of the female flowers and of the fruits, so that strongly as they resemble one another in respect of the inflorescence or "catkins," it becomes expedient to distinguish them into six or eight separate families. Of these, the most interesting and the most largely represented in England, are the oak family, the birch family, and the poplar family. Next come the walnut family and the plane-tree family; and afterwards some little groups consisting only of shrubs. The Amentaceæ compose the great mass of those living and glorious temples we call the woods. The lime, the ash, and the sycamore grow in the hedge-rows and open country; but the silent forest, where we lift up our eyes as into the clouds of a green heaven, where we are always young, and the unquiet world seems to have slipped away like the worn-out skin from the enamelled snake,—this is made chiefly of the grand, immortal Amentaceæ, the silver birch, the

patrician beech, and Olympian oak, those noble trees which, in their youth so green and graceful, in their age turn the wilderness into a Palmyra.

The Amentaceæ are without exception unisexual, some kinds having the male and female flowers upon the *same* tree, when they are said to be "monœcious," or "occupants of one house;" others having them upon two different trees, when they are called "dicœcious," or "occupants of two houses." The males are clustered in "catkins," that is to say, racemes formed of a long and slender stalk, with numerous small bracts regularly arranged upon it for the whole length, and with a tuft of stamens under every bract. (Fig. 187.) The females are produced either in catkins of similar form, but smaller, with solitary ovaries beneath the scales instead of stamens; or they

Fig. 186.
Beech.

Fig. 187.
Birch Catkin.

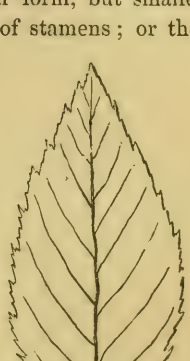


Fig. 188.
Hornbeam.

grow two or three together in the interior of buds, the stigmas alone exposed to sight. Occasionally the catkins, instead of being long and slender, are ovate or nearly globular; and though in general stalked and elegantly pendulous, they are sometimes sessile and nearly upright. Most of the species bloom before the leaves appear, or not much later than the period of the earliest verdure, and very often in cold and angry weather, when the fireside is more inviting than the woodland, though nothing can be more beautiful than the spectacle of a hazle, or poplar, or willow, in the month of daffodils. From the early period of their blooming, and from the greenish and inconspicuous character of the blossoms, it is a very common belief that these trees are *flowerless*.

As regards the leaves, in all but those of the walnut family, they are simple, and it is only in the oaks and a few others that they are in any degree divided.

The Oak Family is distinguished from the remainder of the Amentaceæ, by the large and nut-like fruit being seated in a leafy or woody cup or "cupule," from which it often projects a considerable distance, as in the case of the common acorn. The perianth is adherent to the ovary, and consequently lifted, in effect, on to its summit. The lateral or secondary veins of the leaves very often proceed straight from the mid-rib to the margin, and form beautiful parallel lines, as in Fig. 186. No family is of more importance, nor does it require for its value to be

Fig. 189.
Common Oak.

understood that more be said of it than is conveyed in the names oak, beech, chesnut, hazle, and filbert. Cork for the stoppers of bottles; galls for the manufacture of ink; valonia and bark for the use of the tanner; along with many other invaluable articles of commerce, are the gifts of different species, while others yield magnificent timber, and while alive and growing are among the most superb and aristocratic productions of nature, whether looked at in the emerald pride of summer, or in autumn, when richly "distained with dusky gold." Over two hundred and fifty species have been discriminated, the whole growing spontaneously in the forests of the temperate parts of the northern hemisphere. Six are indigenous to Britain, and all occur, either wild or as settlers, about Manchester.

A.—*Flowers appearing before the leaves.* Male catkins pendulous, loose, and open, pale buff or brownish, one to three inches long, and sessile, with about eight stamens under each scale. Female flowers contained in small and sessile buds, found by their tufts of protruding crimson stigmas. Leaves, when they come out, broadly ovate, rounded at the extremity, but with a point projecting in the centre, doubly toothed along the edges, and coarse and downy on both surfaces ..... 1. HAZLE-NUT.

B.—*Flowers in company with the young leaves.*

- Male catkins globular, compact, pendulous, with five to twelve stamens under each scale. Female catkins globular. Leaves ovate, an inch and a half long, entire, or nearly so, ciliated when young, and with numerous light-brown scales hanging about the petioles; when fully grown, perfectly glabrous, dry, and paper-like. (Fig. 186) ..... 2. BEECH.
- Male catkins cylindrical or spicate.
  - Male catkins spicate, upright, six to eight inches long, stamens five to twenty in each flower. Female flowers three together. Leaves oblong-lanceolate, six to ten inches long, acute, serrate, the serratures ending in sharp points, and glabrous on both sides ..... 3. SPANISH CHESNUT.
  - Male catkins pendulous or nearly so, 2 or 3 in. long.
    - Leaves oval, two inches long, pointed, doubly serrated, beautifully plaited while young. Male catkins cylindrical, sessile, an inch and a half long, with broad sessile scales. Stamens about twelve under each scale. Female catkins slender and loose. (Fig. 188) ..... 4. HORNBEAM.
    - Leaves three to four inches long, deeply and irregularly feather-lobed. Male catkins small, interrupted, pendulous, clustered, yellowish-green, without or with only very small bracts. Stamens six to twelve. Female flowers almost invisible.
      - Leaves on very short petioles. (Figs. 189 and 26) ..... 5. COMMON OAK.
      - Leaves on rather long petioles ..... 6. SESSILE-FRUITED OAK.

THE OAK FAMILY.

The Fruits produced by the Oak Family, which are always some kind of nut, are distinguished primarily by the characteristics of the cup or husk in which they are seated. There are three principal varieties, and each is represented in two distinct trees.

A.

Husks thin, smooth, leafy, and more or less torn and ragged at the edge.

Inner scales of the husk enlarged into large three-lobed bracts, one to two inches long, each of them concealing a small egg-shaped and prominently ribbed nut ..... 4. HORNBEAM.

Husk unequally lobed, with a torn and ragged margin; the nuts solitary, rounded, perfectly smooth, and projecting half an inch or more ..... 1. HAZLE-NUT.

B.

Cups short, elegantly circular, rough with hard scales or tubercles upon the outside, and perfectly even round the edge; the nuts, called "acorns," solitary, smooth, and projecting nearly an inch. Generally clustered in twos or threes.

Peduncles of the cups two to four inches long ..... 5. COMMON OAK.

Cups sitting close upon the stem ..... 6. SESSILE-FRUITED OAK.

C.

Husks prickly upon the outside, closed while young, but opening at the top when ripe; nuts several in each.

Husk with a few scattered prickles, and opening in four valves. Nuts sharply triangular, three quarters of an inch long, and pointed ..... 2. BEECH.

Husks densely covered with sharp prickles, and falling to pieces when ripe. Nuts large, rounded, and bluntly angled ..... 3. SPANISH CHESNUT.

HABITATS AND LOCALITIES.

1. HAZLE-NUT—(*Corylus Avellana.*)

Woods, cloughs, and hedges, everywhere. Fl. February and March, sometimes as early as January. Nuts ripe in September.

Curtis, iii. 551; E. B. xi. 723; Baxter, v. 338.

The filbert is a garden variety of this well-known and valuable tree, having the leafy cups greatly elongated, so as completely to conceal the nuts, which are also much lengthened. Cob-nuts, Barcelona nuts, and others brought to the fruit market, are of corresponding origin. None of our native fruit-trees are of more curious and beautiful economy. The young male catkins for the ensuing season are put forth in September, while the nuts of the current year are scarcely ripe; and in February, when they attain their full length, and hang from the bare brown branches, intermingled with the innumerable crimson-tipped buds that contain the female flowers, they form one of the most delightful harbingers of spring. On a fine sunny forenoon

——— "While yet the wheaten blade
Scarce shoots above the new-fall'n shower of snow,"

a hazle-nut tree in a young wood is one of the most beautiful spectacles that nature affords. Every catkin is loaded with yellow pollen, and a slight shake causes it to be enveloped in a mist of shining particles. The leaves are often marked in the centre with a large and irregular purplish spot, and in autumn turn to a fine and uniform light yellow.

2. Beech—(*Fagus sylvática.*)

Hedgerows, plantations, and parks, common everywhere, the finest specimens occurring in Heaton Park, about Alderley, especially in Lord Stanley's private grounds, and in Oughtrington Park, Lymm,—grand trees, with the throstle, the green linnet, and seven or eight other kinds of birds building their nests in them, so that to climb into one is like entering a little city. Whether in any case truly indigenous about Manchester, is difficult to say, though abundance of young plants spring up at Alderley every year from self-sown seed. Fl. May.

E. B. xxvi. 1846; Baxter, v. 331.

The beech is unquestionably one of the most noble of our forest trees. In spring, when the young leaves make their appearance, the exquisite green light of a beech wood is without parallel. No tree has leaves so delicately thin and transparent; they are edged when they first come out, with fine silvery and silky hairs like white eyelashes, which extend to the veins of the under surface; and to add to their beauty, clinging to the slender flexile twigs on which they grow, are innumerable rose-coloured "perules,"—the scales which wrapped them while yet in the bud, and which, now that they are no longer wanted, are gradually turning to a delicate light brown and falling off. The quantity of these "perules" with which the ground is strewed during May and the early part of June is truly enormous, and makes the pathways where beeches grow resemble a threshing-floor. No tree forms woods so peculiarly dry and pleasant to walk in, though grasses do not thrive beneath the shade; and in autumn, it eclipses every other in the splendour of its auburn and golden dyes. The thin smooth leaves are peculiarly adapted to reflect the rays of the setting sun, and their own colour being rich in the highest degree, they burn and glow under the illumination with a lustre that well-nigh rivals it. The "purple" beech is a variety differing in no respect but that of colour from the common form of the tree; and the copper-coloured a sub-variety of the purple, in which the deeper shade is less developed. The foliage of both, when it first comes out, is of a fine cherry-red. There is a remarkably handsome specimen of the purple on the lawn at Cheadle Rectory, the lowermost branches sweeping close to the grass. (Rectory grounds are generally good places to look in for rare and well-grown trees.) Another variety of this tree, called *laciniata*, has the leaves lanceolate, and deeply and irregularly pinnatifid. Branches with foliage of the normal character often sprout among its boughs, and prove what few on being first shewn it are able to believe, that it is really the same tree with a new face. There is a fine specimen of this variety in

Tatton Park, not far from the "Temple." Prestwich church-yard, where lie the earthly remains of John Horsefield, is planted all round with handsome beeches.

3. Spanish Chesnut—(*Castánea vesca.*)

Parks and plantations, common, but scarcely to be considered wild in any case. Many fine specimens occur in Dunham Park, about Sedgeley, beyond Pendleton, at Withenshaw, and at Alderley. Fl. June.

E. B. xiii. 886 (as *Fagus Castánea*); Baxter, vi. 485.

In fine seasons the chesnut ripens fruit freely, but it is not to be depended on. It is immediately distinguished from every other of nature's glorious sun-shades by the very large, simple, and symmetrically lanceolate leaves, with strong veins running parallel from the midrib to the margin, and extending beyond it in the form of little prickles. The "*horse*-chesnut," with which this splendid tree is often confounded, is quite a different thing, having compound and quinate leaves, as figured on page 157, as well as vast racemes of superb white flowers, whereas in the sweet or Spanish chesnut they are green, and though plentiful, inconspicuous. The only resemblance between the two trees, after their stature, is in the fruit, the *nuts* of the Spanish chesnut being about the same size and of the same colour (though not so polished) as the *seeds* of its magnificent rival. The husks of the latter have but few prickles, whereas in the sweet chesnut they are like hedgehogs.

4. Hornbeam—(*Carpinus Bétulus.*)

Hedges, plantations, and cloughs, common. Abundant in Dunham Park, and about Mobberley, especially in Burley-Hurst Wood, but difficult to determine as an aboriginal. Apparently wild on the banks of the Goyt, below Strines. Fl. April.

E. B. xxix. 2032; Baxter, iii. 234.

5. Common Oak—(*Quercus pedunculáta.*)

Woods and hedges, everywhere, but in general indifferently grown, and really fine only at a distance of at least seven or eight miles, as in Dunham Park; Oughtrington Park, Lymm; and at Alderley. At Marston, near Congleton, there is a wonderful old tree of this species, with a hollow trunk of capacity enough to surround a little flower-garden! Another fine old monument stands in Mere Park, near the old Hall, said to be fourteen yards round at the base, and with rabbits' burrows among the roots. A third, of remarkably fine proportions, but comparatively a youngster, lifts its great green pyramid at the entrance to Peckforton Castle, near the gate. Acorns ripen within a distance of two miles of the town. Fl. May. Fruit in September.

E. B. xix. 1342; Baxter, v. 371 (both as *Quercus Robur*).

The oak, from its great and impressive size, the vast age which it attains, and the hardness and durability of its timber, is in temperate countries universally acknowledged the king of trees, holding the same position with regard to other plants, that the lion does among quadrupeds, and the eagle among birds. Many other trees equal it in picturesque beauty, and others again are not inferior in the quality of their wood, but the oak seems to stand alone in having these advantages *combined*. It is generally eighteen or twenty years old before it begins to bear acorns, a circumstance prophetic of its great longevity. The ordinary height is sixty to eighty feet, and the maximum age fifteen centuries.* No tree is subject to such great variety, either in the form of the individual leaves, of which it seems impossible to find two exactly alike, or in general figure and aspect, and conditions of life. Stand upon some sweet hill-side, where you may look down as from the sky upon their rich round crests, and see the green sward of the valley and opposite slope, mellowed with the moving shadows, and if it be summer, some trees shall be dark green, others shall be pale; if it be autumn, some shall be fast fading and almost leafless, while others are still in their glory; and if it be spring, while one sort is in full leaf, the buds of others are only beginning to burst. The oak is interesting too in the great and curious variety of its inhabitants. The "oak-apples" of May and June, the "currant-galls" of early summer, the "oak-spangles" that so beautifully ornament the under side of the leaves in autumn, and the "artichoke-galls" that are often found terminating the twigs at the same season, are the results of the visits of as many different kinds of insects, all of which find in this supreme tree a congenial abiding place, while the entomologist reckons those that rest or feed upon it by hundreds. There is a variety of the oak with *variegated* leaves. An individual of this kind stands at the end of the hedge of yews beside Mobberley Old Hall.

6. Sessile-fruited Oak—(*Quercus sessiliflóra.*)

Woods and hedges, common, but not so general as the *Quercus pedunculata*. About Clifton. Banks of the Irwell, near Agecroft Bridge. Haughton Vale. Stalybridge Brushes. Plantations about Bowdon. Fl. May.

E. B. xxvi. 1845.

Distinguished by the long stalks of the leaves, and the almost total absence of peduncles to the acorns. It is considered a "spurious" or inferior oak, as to timber, but the question is an open one, as also its specific difference from the *pedunculáta*, with which some authors unite it. That there is in reality only *one* species of oak indigenous to Britain, and that the two names *pedunculáta* and *sessiliflóra* are representatives merely of the extreme varieties, is rendered highly probable by the existence of an intermediate form, which unites the characters of both the others, and is registered by Mr. Leighton, in his "Shropshire Flora,"

* See on these points, and for a variety of information respecting old trees, and on the leases of life generally in nature, "Life, its Nature, Varieties, and Phenomena." Chapter viii. Ed. 2.

under the name of *Quercus intermédia*. This last occurs pretty commonly about Haughton Vale, and elsewhere in that part of the country.

The garden and other cultivated Corylaceæ include the filbert and purple beech before-mentioned, and several species of exotic oaks. Of these the commonest and handsomest is the Turkey oak, or *Quercus Cerris*, the leaves of which are hard and dry, and more deeply pinnatifid than those of the British oak, while the cup of the acorn (which seldom ripens), instead of being simply rough with tubercles, is mossy with long coarse bracts. Next in frequency is the evergreen oak, or *Quercus Ilex*, which has small lanceolate dark-green leaves, that always have a dusty and half-withered look, and acorns not larger than hazle-nuts. The red American oak, or *Quercus rubra*, is a low-growing and rather scrubby tree, but valued for the splendid colour assumed by its great leaves in autumn. Along with one or two others, it is not uncommon in good shrubberies.

CXVII.—THE BIRCH-TREE FAMILY. *Betulàceæ.*

The Birch-tree Family is composed simply of the various species of birch and alder, and is distinctly defined among the Amentaceæ, by having the ovary of the female flowers free within the perianth, and

Fig. 190.
Alder.

provided with two cells, each of which contains a single and minute seed, the head of fruits being in the form of a little catkin. The leaves are simple, undivided, and petiolate. It is diffused throughout the woods of Europe, Northern Asia, the Himalayahs, and North America, and makes its appearance even upon the mountains of Columbia and Peru, and in the antarctic regions, capable apparently, in certain

species, of existing up to the last confines of land and perennial snow. The species are timber trees for the most part, but are valued chiefly for their ornamental character in landscape. Sixty have been distinguished, two of them being natives of our own country, and wild near Manchester, as well as extensively planted.

1. A tall forest-tree, in lightness, grace, and elegance unsurpassed, and distinguishable, as far as the eye can reach, by the silvery whiteness of its bark. The twigs are remarkably slender, and in the variety called "pendula" droop for nearly their whole length, waving with the slightest breath of air. Leaves varying from triangular to ovate or broadly heart-shaped, unequally serrate, and pointed, supported on long and slender petioles, glabrous, shining, and deciduous. Male flowers in cylindrical light-brown catkins, with eight to twelve stamens under each scale, usually pendulous, and nearly two inches long; female flowers in compact, greenish catkins, not more than a third of the length of the males, and appearing, along with them, in company with the young leaves. The female catkins, when ripe, are an inch or more in length, and break up into numerous little wedge-shaped scales, each of which is accompanied by a small, flat, and winged fruit resembling a seed....Common Birch-tree.

2. A tree of inconsiderable stature, dark and rugged in its aspect, with crooked and spreading branches, and by no means picturesque if looked at too near. When the trunk has in any part been laid bare, or deprived of its bark, exposure to the atmosphere for a little while causes it to assume in that part, a peculiar and characteristic red colour. Leaves large, broadly ovate or roundish, very blunt at the upper end, sharply-toothed, stalked, glabrous, and deciduous. When young, they are glutinous. (See Fig. 190.) Male catkins long, loose, deep reddish-brown, growing two or three together on terminal and branched footstalks, and pendulous; female catkins not more than half an inch long, and seated close to the males, both kinds appearing before the leaves come out, and the males very conspicuous from their size and deep colour. The females are, while ripening, oval, dark-green, and solid, like young fir-cones; afterwards they become hard and woody, the scales separating, (but not falling from the axis, as they do in the birch) and allowing the wingless seeds to fall out. The clusters of black and emptied relics usually hang upon the trees through the winter, and often until the following summer. The new males appear in September like those of the hazle-nut, but not so conspicuously .....Common Alder.

HABITATS AND LOCALITIES.

1. Common Birch—(*Betula alba.*)

Everywhere in hedgerows, woods, and plantations, but impossible to say where truly wild. Apparently so on the banks of the Goyt, in

Marple Wood, and on the borders of the mosses. In gardens and plantations the variety *pendula* is the most frequent. Fl. April, May.

E. B. xxxi. 2198; Baxter, v. 326.

The birch tree must always have been plentiful in the district, and absolutely wild at one time, since large quantities of ancient fragments, with the silvery bark adhering, and portions of trunks, are found when the peat is removed, during the draining of the mosses. At Carrington the fragments are particularly abundant, though the stumps of the uncovered trees are not so large as those at Lindow. (See "Walks and Wild-flowers," pp. 99—103.) In aged trees, the bark splits into deep, wide fissures, and the continuity of the white covering is broken. The latter, especially in young trees, is prone to peel off transversely. By reason of the extreme delicacy and gracefulness of the branches, and swaying pensile twigs, which float like ringlets, the poets call the birch "the lady of the woods."

2. Common Alder—(*Alnus glutinósa.*)

In wet and swampy places, on the borders of ponds, and in damp cloughs, everywhere, and forming, like the willow, a characteristic adjunct of the water-side. It will grow, however, in dry land, and even by dusty waysides, as at Didsbury; but its delight is in wet, and very wet land, such as the edges of running brooks, especially where the water breaks out and steeps the soil. Fl. March.

Curtis, iii. 550; E. B. xxi. 1508 (as *Betula Alnus*); Baxter, iii. 193.

CXVIII.—THE POPLAR FAMILY. *Salicáceæ.*

Like the birch family, this small but interesting group of trees comprises no more than two genera, viz., *Populus*, including poplars of all kinds, and *Salix*, which includes the willows, the sallows, and the osier. Their catkins of two-valved and lanceolate capsules, discharging abundance of little seeds covered with long white silky hairs, markedly distinguish them not only from the immediately related families, but from all others that have unisexual flowers. The only shrub at all resembling them among the bisexual families is the tamarisk (p. 164), and even here the sole point of agreement is the fruit and feathery seed. The leaves of the Salicaceæ are alternate, simple, and undivided, usually petiolate, serrate, and pointed, with the veins "deliquescent," or spreading irregularly, as in Fig. 195, and never with parallel ribs extending from the midrib to the margin, as happens in the oak family, and in the alder. The outline varies from narrow lanceolate to round or triangular. Many of the poplars are

remarkable for having their long and slender petioles flattened at a right angle with the blade or lamina, the consequence of which is that the wind in playing among the leaves is always met by a broad surface, and hence the pretty and incessant quivering which has made a proverb of the aspen, in which species the movement is incessant. The catkins, both male and female, are in almost all cases "diœcious," or upon separate individuals; they are usually large and handsome, and in spring contribute greatly to the ornament of the groves and hedgerows. In many instances they do not appear till after the leaves are open.

Fig. 191.
Willow—Female catkins.

Fig. 192.
Willow—Male catkins.

Both the poplars and the willows are valuable, either as timber-trees, or for miscellaneous economic purposes. The use of osiers for basket-making, and of sallow-wood for the manufacture of charcoal, is well known. They are natives of much the same districts as the members of the oak and birch families, namely, of the temperate parts of the northern hemisphere, and extend even further towards the pole. The most northern woody plants known are the two little willows called *Salix arctica* and *Salix polaris*. The *Salix herbacea*, which is another arctic species, creeps southwards as far as our own country. (Figured in E. B. xxvii. 1907.) A very considerable number of

species have been registered in books, and most of the poplars are probably true ones; but a large portion of the reported willows are unquestionably suppositious. The great variation in the forms of the leaves of certain kinds; the difficulty of matching the males and females, since they very rarely grow in company; and the further difficulty of matching the foliage and the flowers of those that bloom before the leaves are open, render the study of the genus exceedingly perplexing, and will always keep it so to the young student. As regards those which bloom before the leaves, unless they be marked in some way (as with a bit of coloured ribbon tied round one of the branches), and leaves be gathered, when ready, from the same individual, it is utterly impossible to know anything accurate about them.

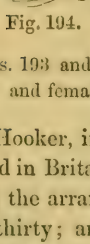


Fig. 193.

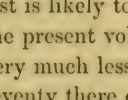


Fig. 194.

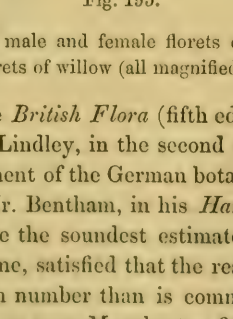


Fig. 195.

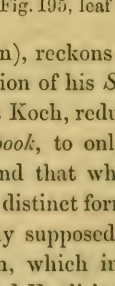


Fig. 196.

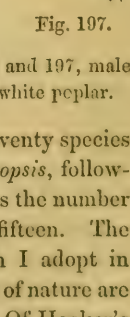


Fig. 197.

Figs. 193 and 194, male and female florets of poplar; Figs. 196 and 197, male and female florets of willow (all magnified). Fig. 195, leaf of white poplar.

Hooker, in the *British Flora* (fifth edition), reckons seventy species wild in Britain; Lindley, in the second edition of his *Synopsis*, following the arrangement of the German botanist Koch, reduces the number to thirty; and Mr. Bentham, in his *Hand-book*, to only fifteen. The last is likely to be the soundest estimate, and that which I adopt in the present volume, satisfied that the really distinct forms of nature are very much less in number than is commonly supposed. Of Hooker's seventy there occur near Manchester fifteen, which in the following pages appear as nine; and of the four reputed English and Manchester poplars, I admit three, mentioning however, as with the *Rubi*, the names and localities of the whole. Of some species we have no male trees; of others no females; I give the characteristics, nevertheless, of the flowers of both sexes, in case they should be met with elsewhere.

The great distinction between the two genera Salix and Populus is, that the stamens in the former are usually two, and very rarely three or five, while the scales of the catkin are entire, the poplars having eight to twelve stamens, and the scales of the catkin torn and ragged. (Figs. 193, 194, and 196, 197.) The leaves of the willows are generally narrow and motionless; and those of the poplars broad and quivering.

Genus *SALIX*, or WILLOWS and OSIERS.

Section 1.

Catkins appearing before the leaves.

A.—*Male plants.*

* Stamens two.

Stems more or less procumbent, creeping extensively underground, and rising six to twelve inches above the surface. Leaves, when they appear, elliptic-lanceolate, under an inch long, acute, entire, or nearly so, generally very white and silky underneath. 9. Creeping Willow.

Stems erect and shrubby, five to eight feet high.

Stems very long, straight, round, slender, unbranched, except at the base, or nearly so, wand-like, and pliant. Leaves, when they appear, linear-lanceolate, often four to five inches long, obscurely crenate, white underneath with copious silky down. Before they open the edges are rolled back ..... 6. Common Osier.

Stems branched and spreading.

Catkins broadly egg-shaped, one to two inches long, and often an inch in diameter, with long silky hairs. Leaves, when they appear, ovate-elliptical, acute, serrate, a little wrinkled, glabrous above, cottony and very veiny beneath, but not silky. Stipules small, and usually only upon the upper leaves..... 7. Common Sallow.

Catkins one-half to three-quarters of an inch long, and half an inch in diameter, closely sessile on the twigs, and with very few and short silky hairs. Leaves, when they appear, obovate, much wrinkled and curled, tipped with a small curved point, gray and downy, especially on the under side. Stipules very large, conspicuous, and characteristic ..... 8. Ear-leaved Sallow.

** Stamen solitary. (There are two stamens in reality, but the filaments are united, so as to make them appear but one. The anther is consequently quadruple.)

Catkins cylindrical, obtuse, very compact, downy, closely sessile along the twigs, and generally opposite. Anthers purple after flowering. Leaves, when they appear, usually long and narrow, but variable in width, broadest upwards, linear towards the base, pointed, slightly serrate, smooth, and of a fine green colour. Bark often yellow, or purplish, or coral-red, and glossy. A shrub six to eight feet high 5. Purple Willow.

B.—*Female plants.* (Ovaries silky or downy.)

* Stems procumbent.

Stems creeping extensively under ground, and rising six to twelve inches above the surface. Ovaries on long stalks, lanceolate, and very silky. Leaves, when they appear, as described above .... 9. Creeping Willow.

** Stems erect. (Shrubs or small trees.)

Branches very long, straight, slender, wand-like, and pliant. Leaves, when they appear, as described above. Style very long .... 6. Common Osier.

Branches spreading.

Ovaries very obtuse, oblong ovate, usually sessile, and cottony-white. Catkins very compact. Leaves, when they appear, as described above ..... 5. Purple Willow.

Ovaries tapering and pedicellate.

Bracts on the peduncles several. Catkins, when in fruit, two inches long or more. Leaves, when they appear, as described above 7. Common Sallow.

Bracts on the peduncles few. Catkins, when in fruit, an inch long. Leaves, when they appear, as described above. 8. Ear-leaved Sallow.

Section 2.

Catkins and leaves appearing at the same time, the former on leafy twigs.

A.—*Male plants.*

Stamens five. Catkins numerous, large, and handsome, one and a half to two inches long, upright, yellow and fragrant, and terminating the new shoots of the year. Leaves elliptic-lanceolate, acute, serrate, bright dark glossy green, glabrous, and exuding an aromatic odour from minute black glands along the edges. A shrub or small tree, six to twelve feet high ..... 1. Sweet Bay-leaved Willow.

Stamens three. Catkins conical at first, cylindrical afterwards, upright, an inch to an inch and a half long, bright yellow, and fragrant. Leaves oblong-lanceolate, acute, serrate, glabrous, white underneath, but not silky, and rather unequal at the base. Bark yellowish-green. A shrub or small tree, six to eight feet high..... 4. Smooth Willow.

Stamens two. Catkins lax and elongated. Large trees.

Leaves lanceolate, several inches long, serrate, acute, silky white on both sides, especially while young; often glabrous when old, but never bright green ..... 3. Common White Willow.

Leaves ovate-lanceolate, four to five inches long, acute, serrate, glabrous, dark green, and shining on the upper surface. 2. Common Crack Willow.

B.—*Female plants.*

Leaves green on both sides, and glabrous, or nearly so.

Shrub or small tree, six to twelve feet high, with aromatic foliage, as described above ..... 1. Sweet Bay-leaved Willow.

Large tree, with scentless foliage, as described above. 2. Common Crack Willow.

Leaves white on both sides; a large tree, with foliage as described above 3. Common White Willow.

Leaves green above, white underneath.

Branches spreading. Leaves as described above..... 4. Smooth Willow.

HABITATS AND LOCALITIES.

1. Sweet Bay-leaved Willow—(*Salix pentandra.*)

Male trees:—Borders of ponds, and on banks of rivers, frequent. Three-lane-ends, Chorlton. Rusholme. Back Levenshulme. Between Bramhall and Poynton. Broadbottom. Marple. Moston. Banks of the Mersey, near Stretford aqueduct. By the pond on the right hand after going under the East Lancashire railway arch, and ascending to Clifton Station. *Female trees:*—Pilsworth, near Middleton. Fl. end of May and beginning of June.

E. B. xxv. 1805.

The handsomest of the shrubby English willows, the large and abundant yellow catkins contrasting most agreeably with the copious and shining foliage, which has the look of some fine evergreen rather than that of a plant that annually sheds its leaves. In warm weather both leaves and catkins exhale a delicious aromatic perfume. This beautiful shrub grows readily from cuttings, and will make itself at home in the dry soil of a town garden.

2. Common Crack Willow—(*Salix fragilis.*)

Male trees:—Banks of the Tame and Bollin. *Female trees:*—On the banks of rivers, and in low moist grounds, and by roadsides, common everywhere. Fl. May.

E. B. xxv. 1807.

A large and bushy tree; generally distinguished, *par excellence*, as "the Willow." It is remarkable for the crookedness of its branches, which while young readily snap off, and have originated the name *fragilis*. The Bedford willow, or "*Salix Russelliana*," (E. B. xxv. 1808.) does not appear distinguishable. Mr. Sidebotham has noticed it on the right bank of the river Tame, opposite Arden Hall, and elsewhere.

3. Common White Willow—(*Salix alba.*)

Male trees:—River-banks, and in moist and swampy places, common. Abundant near the Mersey, at Lymm; on the banks of the Tame, opposite Arden; and on the banks of the Bollin, between Bowdon and Rostherne. *Female trees:*—Rare. Fl. May.

E. B., xxxiv. 2430.

The silvery gray of the foliage, caused by the close-pressed silky hairs, renders this tree remarkable, and conspicuous from a long distance, and when, as often happens, it fringes rivers, enables us to trace their course across the country, a circumstance ingeniously made use of by painters of landscape. The peculiar colour, and the plume-like character of the branches, give it also an air of

lightness and grace which wonderfully adds to the beauty of scenery, the contrast with trees of deeper tint producing an effect at once singular and agreeable. This and the *Salix fragilis* are the two largest of the genus.

4. Smooth Willow—(*Salix triandra.*)

Male plants:—Wet woods, pondsides, and osier grounds, very rare. Pondsides near Marple aqueduct. (Mr. Sidebotham.) *Female plants:*—None? Fl. May.

Curtis, ii. 436; E. B. xx. 1435.

5. Purple Willow—(*Salix monándra.*)

Male plants:—Banks of rivers and marshy places, rare. Right bank of the Mersey, near Carrington Ferry. In several places near Marple aqueduct. (Mr. Sidebotham.) Sparingly about Ashley. Several places at Prestwich. (J. P.) *Female plants:*—None? Fl. March, April.

Curtis, ii. 435; E. B. xix. 1343 (as *Salix Helix*).

6. Common Osier—(*Salix viminális.*)

Male plants:—Wet places, by streams, and in osier grounds, or twig beds, common. *Female plants:*—In similar situations. Fl. April, May.

E. B. xxvii. 1898.

A variety of this species, with rather broader and hairy leaves, and the capsules more distinctly pedicellate, has been distinguished as "*Salix Smithiana.*" It is the same as the *Salix mollissima*, of E. B. xxi. 1509. The female is not uncommon in the same habitats and localities.

7. Common Sallow—(*Salix Capréa.*)

Male plants:—Woods, pondsides, and in damp hedges, common everywhere. *Female plants:*—In similar situations, and equally abundant. Fl. April, May.

E. B. xxi. 1488.

The first of our willows to come in bloom, and in every way a pretty and interesting shrub. The large golden-yellow male catkins, and the silvery-gray females, deck the bare branches in the most beautiful manner, and later in the season, when the leaves are out, the matured ovaries pour forth quantities of fine white silky seeds, though a large proportion of them seem imperfect, and which hang about the plant like locks of wool. Along with the other early and leafless

bloomers, this is the plant commonly called "palm," and used by the Roman Catholics of England in their Palm-Sunday ceremonies.

In Rome, upon Palm-Sunday,
They bear true palms,
The cardinals bow reverently,
And sing old psalms.
Elsewhere those psalms are sung
Beneath the olive branches;
The holly-bough supplies their place
Amid the avalanches.
More northern climes must be content
With the sad willow.

The variation in the shape, size, and surface of the leaves of the sallow is considerable, and many supposed species have in consequence been registered. Three of these forms occur near Manchester, viz.,

The olive-leaved sallow, (*Salix oleæfolia*, E. B. xx. 1402);

The water sallow (*Salix aquatica*, E. B. xx. 1437); and

The gray sallow (*Salix cinerea*, E. B. xxvii. 1897).

They grow in wet hedgerows, and by pondsides, and appear to pass insensibly into one another.

8. Ear-leaved Sallow—(*Salix aurita.*)

Male plants:—Moist woods and thickets, in damp hedgerows, and by pondsides, abundant. *Female plants:*—In similar situations, and equally common. Fl. end of April and beginning of May.

E. B. xxi. 1487.

9. Creeping Willow—(*Salix repens.*)

Male plants:—Heathy and sandy places, rare. Dry spots at Baguley, on the site of the extinguished moor; Lindow Common, sparingly. Unsworth. (J. P.) *Female plants:*—With the males. Fl. spring.

E. B. iii. 183. (The Manchester plant is referable perhaps rather to the *S. argentea* of E. B. xix. 1364, and to the *S. prostrata* of E. B. xxviii. 1959.)

Genus *POPULUS*, or POPLARS. (Three species.)

1. A tall and handsome tree, rising forty to fifty feet high, with spreading branches, and smooth, light-gray or ash-coloured bark, the young shoots covered with white and cottony down. Leaves petiolate, in outline roundish, heart-shaped, or triangular, but so deeply toothed on each side as to be almost three-lobed; the upper surface very dark and rather glossy green, and glabrous; the under surface closely covered, like the young shoots, with cottony down, which renders it remarkably white. Catkins large, sessile, pendulous, two to three inches long; the male ones with about eight stamens under each of the jagged and hairy scales; the females with four stigmas, the lobes of which are linear. Numerous suckers usually arise from the base of the trunk, and the leaves are generally fluttering. (Fig. 195)..... White Poplar.

2. A large and lofty tree, of very rapid growth, much branched at the upper part, but not picturesquely, and perfectly glabrous in every part. Leaves broadly triangular, acutely pointed, serrate, glabrous on both surfaces, and twice as long as their slender and flattened petioles. Catkins lax and pendulous, the male ones of a fine reddish brown, almost crimson while young, and appearing before the leaves are out; the scales, which have each about sixteen stamens underneath them, hairy only at the tips. Buds very glutinous. No suckers from the base of the trunk; foliage usually fluttering ..... BLACK POPLAR.

3. A smaller tree than either of the preceding, of slower growth, and with slenderer branches. Leaves nearly circular, thin, often not more than an inch across, toothed, scolloped, and angular, though variably, glabrous on both sides, and supported on particularly slender stalks, which are flattened laterally towards the end, as in the other native species, but even more decidedly, so that the blade trembles with the slightest movement of the air. Catkins rather small; the scales deeply divided; stamens six to eight ..... ASPEN.

HABITATS AND LOCALITIES.

1. WHITE POPLAR—(*Pópulus alba.*)

Hedgerows and plantations, common, though in most cases introduced. Many fine specimens occur by the side of the Cheadle road. Fl. April.

E. B. xxiii. 1618.

A variety of this tree, with smaller leaves, which are seldom lobed, and not so white underneath, is by many botanists distinguished as the gray poplar, or *Populus canescens.* (E. B. xxiii. 1619.) It occurs, not unfrequently, in most directions out of Manchester. The white poplar is sometimes called the *Abele.*

2. BLACK POPLAR—(*Pópulus nigra.*)

In hedgerows and damp woods, common, but generally, perhaps always, from the hand of the planter. Very abundant about Chorlton, Cheadle, and at Gatley Carrs. Fl. April.

E. B. xxvii. 1910; Baxter, vi. 506.

The fine red catkins give this tree a glowing beauty in early spring which is unequalled by any other of the Amentaceæ. They strew the ground in abundance after flowering, and at the same season there may be picked up thousands of delicate skeletons of the preceding year's leaves, deprived of their soft and cellular part by the action of the elements during winter.

3. ASPEN—(*Pópulus trémula.*)

In hedgerows, moist woods, and plantations, especially where the

soil is gravelly, not uncommon, but doubtfully wild. Stalybridge Brushes; Agecroft hills; Cheadle. Fl. April.

E. B. xxviii. 1909.

The *Salicaceæ* grown in gardens and shrubberies comprise the "weeping willow," or *Salix Babylonica;* the golden osier, or *Salix vitellina*, (E. B. xx. 1389.) and the green-leaved osier, or *Salix rubra*, (E. B. xvi. 1145.) which last is probably not distinct from the *S. monandra*. In the Botanic Gardens there are a few others, such as the *Salix Andersoniana*, *Salix Forbyana*, and *S. Doniana*, and curious cultivators are often fond of the little *Salix repens*, which in rich soils becomes more erect, and with branches often three to four feet long. The exotic poplars comprise the Lombardy or Italian—*Populus fastigiáta*—that tall, well-known, and spire-like tree which is commonly spoken of as *the* poplar,—the only spire-like tree that casts its leaves in autumn, and the vertical branches of which rarely ever touch either one another or any neighbour; and the balsam, or Canada poplar—*Populus balsamifera*—distinguished by its enormous triangular leaves, and the delicious balsamic fragrance which it exhales while the buds are opening. The Lombardy poplars in our neighbourhood are all males, and the balsam poplars all females. The catkins of the latter, filled with white cotton—the limit of the tree's efforts to produce seeds—hang upon the branches, and strew the ground, when they drop off, in immense quantities. The petioles are not flattened laterally, like those of the English poplars, so that the leaves do not tremble. Both species are exceedingly common, the latter especially in suburban gardens.

CXIX.—THE PLANE-TREE FAMILY. *Platanáceæ.*

The single genus *Platanus*, containing perhaps half-a-dozen species, is the whole that this family is at present known to consist of. They are noble timber-trees, natives of the western parts of Asia, Barbary, and North America, and are extensively cultivated, in climates that suit them, for the sake of their grand appearance, and their ample and generous shade.

> Broad-leaved plane-trees, in long colonnades,
> O'erarch delightful walks.

Near Manchester we have only one kind, the *Platanus occidentalis*, and that neither frequently nor of size and stature such as it reaches in the southern counties. The leaves are, in outline, like those of the sycamore, with which tree uninstructed gardeners often confound it, but the downy petioles, and scarious and sheathing stipules keep it abundantly distinct. The leaves of the plane are also of much firmer texture, hard, thick, and almost leathery. The flowers grow in globular and pendulous catkins, not unlike those of the water-burr, or *Spar-*

ganium, and hanging together, when ripe, in twos and threes, form an excellent and ready distinctive character. The bark peels of in shreds during spring and early summer. There is a tolerably good specimen of this noble tree on the left hand side of the road leading from Oxford-road to Victoria Park, opposite Moss Lane end, standing between a Spanish chesnut and an elm. Others occur in private grounds in the same neighbourhood, the two best standing upon the lawn at "The Oaks" (Mr. Ogden's), but not within view from the road. There is another in the garden at Cheadle Rectory.

CXX.—THE FIG-TREE FAMILY. *Moráceæ.*

None of this family are European by birthright, nor are any seen out of doors in England except the mulberry and the common fig. The latter, *Ficus Carica*, usually grows eight or ten feet high; the bark is smooth and gray, and on being wounded, pours out a milky juice of peculiar odour; the leaves are the size of a man's hand, rough, and upon long petioles, with about five great finger-like and rounded lobes. The flowers are contained in the young figs, which resemble small green pears, and are in reality concave and fleshy receptacles, nearly closed at the top, and bearing on their inner surface a vast number of minute and incomplete flowers, which of course are only seen by cutting the fig in half. This valuable and interesting tree is not uncommon in good gardens about Bowdon, Lymm, Withenshaw, and elsewhere south of Manchester. It is generally trained against walls, and in favourable seasons ripens fruit. It is also grown in green-houses.

The mulberry, or *Morus nigra*, in its full-grown state, is rarer. Young trees occur pretty frequently in arboretums, but few large and old enough to bear fruit except at Sale, Withenshaw, Cheadle, and thereabouts. The finest perhaps are those in the kitchen-garden at Alderley Park. It is a good-sized though rather scrubby-looking tree, with large, heart-shaped, rough, and pointed leaves, the edges serrate, and sometimes varying to three-lobed. The flowers are green and inconspicuous, and the purple fruits like large blackberries. It is one of the very last trees to put forth its leaves, seldom being green over till the middle of June.

The hot-house species of the Moraceæ include the india-rubber tree,

or *Ficus elastica*, with noble oval leaves a foot in length; the little *Ficus repens*, esteemed as a self-adhesive tapestry for walls, and perhaps one or two others.

CXXI.—THE WATER-STAR FAMILY. *Callitrichàceæ.*

A family of half a dozen insignificant aquatics, with long and slender stems, generally submerged in the water, but sometimes forming dense green masses on the surface of mud. Leaves small, oval or linear, entire, and undivided, the uppermost growing in compact rosettes about an inch in diameter; the rosettes from their number, bright and lively green, and pretty star-like figure, presenting a conspicuous object as they lie floating in the ditches and ponds, which are the common habitations of these little but abundant plants. The flowers are exceedingly simple. The males grow in the axils of the rosetted leaves, and consist only of a stamen, the large yellow anther contrasting strongly with the green of the foliage; the females occupy the lower axils, or where the leaves are some distance apart, and consist of a green, two-lobed, and sessile ovary, with long green styles. Neither male nor female flowers have any perianth, though usually provided with a pair of opposite bracts.

Four species have been described as wild in England, but it is difficult to suppose that they are anything more than modifications of a single one. The two principal forms both occur near Manchester.

1. Leaves obovate or oblong. Female flower with two bracts at the base ..... } Vernal Water-star.
2. Leaves all linear. Female flower destitute of bracts ..... { Autumnal Water-star.

HABITATS AND LOCALITIES.

1. Vernal Water-star—(*Callitriche verna.*)

Ditches and shallow waters, everywhere. Fl. end of May and onwards. Annual.

Curtis, iii. 54; E. B. xi. 722 (both as *Callitriche aquatica*); Baxter, v. 392.

2. Autumnal Water-star—(*Callitriche autumnàlis.*)

Similar situations. Fl. summer. Annual.

E. B., Supp. i. 2732, with beautiful dissections. (The "*C. autumnalis*" of E. B, Supp. i. 2606, is the plant called in Floras "*pedunculata.*")

CXXII.—THE WALNUT FAMILY. *Juglandáceæ.*

Another small family of noble trees, found almost exclusively in North America, though the best known, or common walnut, the *Juglans regia*, is a native of Persia and Cashmere. This delightful and precious tree is immediately known by the rich aromatic odour of its immense pinnate leaves, formed of about nine leaflets, which are oval, glabrous, yellowish green, and a little serrated. It is one of the last trees to come in leaf, and is very soon dismantled again, being unable to withstand the nipping of autumnal frosts. The male flowers grow in very long and handsome pendulous catkins; the females in sessile and terminal clusters of the same colour, both growing upon the same tree, appearing in company with the young foliage, and about the time of the blooming of the purple rhododendron. The walnut is not an uncommon tree, especially near old halls, and other residences of note, and in good seasons ripens its dainty fruit freely and abundantly. There are fine ones at Ashley Hall, and in the neighbourhood of Lymm and Statham. Two or three stand by the roadside near Didsbury College. The hickory and butter nuts of the shops are the produce of the *Carya alba* and *olivæformis*, the former of which is sometimes grown for ornament.

CXXIII.—THE SWEET-GALE FAMILY. *Myricáceæ.*

Leafy shrubs or small trees, covered with resinous glands, which exhale a strongly aromatic and pleasant odour. About twenty species are known, all extra-European except the common sweet-gale, which is also the only one known to ordinary botany. This, the most spicy of British plants, belongs to the Flora of Manchester, both in the wild state and in gardens. The stems are shrubby and branched, two to three feet high, and well covered with alternate, oblong or lanceolate leaves, broader upwards, and slightly toothed towards the extremity, and often rather downy on the under side. The flowers are collected in egg-shaped and sessile catkins, about half an inch in length, and dispersed along the ends of the branches, the males and females growing on different individuals, and both appearing before the leaves come out. When ripe, the female catkins are somewhat lengthened. The scales are of a pretty light-brown colour, edged with white.

HABITATS AND LOCALITIES.

SWEET GALE—(*Myrica Gale.*)

In bogs and upon wet moors, not uncommon. Borders of Chat Moss, especially in Botany-Bay Wood, where it grows three to four or five feet high. (J. E.) Barton Moss. Unsworth Moss. Abundant in the bog at the edge of Rostherne Mere. Boggy ground at Three-lane-ends, Chorlton. Fl. spring.

E. B. viii. 562; Baxter, vi. 489.

CXXIV.—THE SHEPHERDIA FAMILY. *Elæagnáceæ.*

Shrubs and small trees, remarkable for having their leaves, and to a great extent their stems also, covered with a silvery-white and leprous scurf, as closely as fishes are covered with scales. One of them, called the sea-buckthorn or *Hippóphae rhamnoides*, (E. B. vi. 425.) grows wild upon the coast of some parts of England, and has been transplanted into gardens. It is a tree of about eight or nine feet high, the branches of which end in thorns, with linear and scattered leaves, silvery on the under surface, and small unisexual flowers, the males growing in clusters resembling catkins, the females solitary in the axils. The only other species commonly cultivated is the *Shepherdia argentea*, the ovate-lanceolate and pointed leaves of which seem washed over on both sides with some shining metallic solution. The scales, when removed, and examined with a microscope, are found to be of a star-like figure, and perfectly transparent. Except in the unisexual flowers, and erect, not pendulous, ovule, this family differs little from the Thymelaceæ.

CXXV.—THE GARRYA FAMILY. *Garryáceæ.*

A little family of Californian shrubs, interesting to Manchester botanists in its principal species, the *Garrya elliptica*, a beautiful evergreen, with oval and opposite leaves, found occasionally upon the lawns of villa residences. The flowers, which appear in early spring, grow in handsome green pendulous catkins, four or five inches long when fully opened, and rendered perfectly cylindrical by their large and elegantly concave and connate bracts.

I am indebted for my knowledge of this very interesting and curious plant to the kindness of my friend Herman Reddelien, Esq., whose charming grounds might well be named the Alderley Botanic Gardens.

Class II.—ENDOGENS.

Section 1.—PETALOID.

CXXVI.—THE LILY FAMILY. *Liliáceæ.*

Foremost among the Endogens, as known to England in the wild state, and as flowers of the garden and conservatory, are the incomparable forms which have their type in the lily, and which are commonly called by the same name. These lily-like plants are, however, a very different thing from the "Liliaceæ" of botanists. Agreeing in many important particulars, their structure is nevertheless widely diversified; and on the other hand, species are not wanting that have scarcely any external likeness to lilies, and yet are most intimately related to them. Such are asparagus and the butchers'

Fig. 198.
Wood Garlic.

broom, which is a shrub with prickly leaves. The popular idea of "lily" comprehends indeed not only all Endogens that have lily-like flowers and foliage, but many plants that have only a suppositious resemblance to lilies, such as the Nymphæaceæ, or "water-lilies," among Exogens (p. 81). It becomes important, therefore, to discriminate carefully between the two or even three senses in which the name is apt to be used, and to bear in mind that it applies properly only to the members of the particular family we are now about to take under consideration. Taken in the wide sense of the word, no plants have been so universally admired and cultivated as the liliaceous tribes; they live in the poetry of every age and every nation; they carry the regalia of the kingdom of flowers; the highest and holiest teaching the world has ever known, enjoins us to "consider the lilies of the field."

The families commonly associated under the idea of "lily" are the true Liliaceæ, and those named after the Snowdrop, the Crocus, and the Orchis. The whole of their respective species, with a few exceptions, are herbaceous: they very commonly have bulbous or tuberous roots: their leaves are alternate, parallel-veined, and usually succulent; in almost all cases narrow, varying from linear to lanceolate or oval; always entire, seldom provided with petioles, and never articulated to the stem, so that when they wither, instead of a scar, there remains a stump. The calyx and corolla each consist of three pieces, which usually correspond in size and colour, and also in texture, their substance being very delicate and generally succulent. A purely green calyx, unless the whole flower be green, is unknown among them. The six pieces are either free, or united half-way up, but never into an inner and an outer tube, as in the calyx and corolla of dichlamydeous Exogens, and are generally very satiny and gaily coloured. The stamens are normally six or three; and the ovary is, without exception, solitary. Most of the species are deliciously fragrant.

They are broadly distinguishable as follows:—

* Flowers regular, or nearly so; stamens distinct from the pistil.
Ovary "superior," or free and enclosed by the perianth..... *Lily Family.*
Ovary "inferior," or having the perianth adherent to it, and carried, in effect, on to the summit.
Stamens six ..... *Snowdrop Family.*
Stamens three ..... *Crocus Family.*
** Flowers extremely irregular; stamens incorporated with the pistil ..... *Orchis Family.*

There are plants, without question, having more or less of a liliaceous aspect, in families different from these four, but the great mass of the "lilies" are here assembled in quadruple alliance.

The true Liliaceæ amount to at least a thousand species, and are diffused very generally in temperate countries, where, with one or two exceptions, they are herbaceous; while the fewer kinds, which belong to the tropics, manifest a strong tendency to become tree-like. Flowers always regular; stamens six, inserted upon the sepals and petals, one to each, with their anthers opening inwards; ovary free or "superior" and three-celled; stigma either simple or three-lobed; fruit a dry, three-celled, many-seeded capsule, bursting into three valves when ripe, and discharging the seeds; or in some cases a succulent berry.

The British species amount to twenty-eight, six of them growing wild near Manchester.

A.—*Flowers deep golden yellow.*

Stem decumbent at the base, afterwards erect, stiff, six to twelve inches high. Leaves linear, three to six inches long, flat, curved like a scimetar, and standing edgeways. Flowers in a terminal raceme, half an inch across, star-like, greenish at the back. Stamens covered with woolly hairs. Anthers scarlet ..... 1. Lancashire Asphodel.

B.—*Flowers not in the least yellow.*

Flower-stems leafy.

Stem nearly two feet high, the upper part inclining to one side, so as to form half a Gothic arch. Leaves oval, three or four inches long, pointed, spreading, and turning upwards in two ranks. Flowers tubular, an inch long, whitish, green-tipped, axillary, in twos or threes, and pendulous. Berries dark purple ..... 6. Solomon's Seal.

Stem slender, twelve to fifteen inches high, with three or four linear leaves, and a large, solitary, terminal, and drooping bell-shaped flower, formed of six separate pieces, regularly chequered with dull and light red, like a chess-board ..... 4. Snake's-head Lily.

Flower-stems leafless. Leaves all radical.

Leaves broadly-lanceolate, petioled, six to eight inches long, and an inch or more broad. Flower-stems nine inches high, three-cornered, bearing a large loose umbel of about a dozen snow-white and star-like flowers, with two large and whitish bracts underneath. Ovary three-lobed. Whole plant intensely garlic-scented. (Fig. 198) ..... 3. Wood Garlic.

Leaves linear, weak, and flaccid. Flower-stems six to eight inches high, cylindrical, and bearing a large loose corymb of white and star-like flowers which, when opened by the sunshine, are nearly an inch across, the six component pieces each with a broad green stripe down the back. Ovary six-angled. Lower peduncles much longer than the upper ones ..... 5. Common Star of Bethlehem.

Leaves long and linear. Flower-stems about a foot high, cylindrical, brittle, with a terminal one-sided raceme of two or three to twelve drooping blue flowers, which are tubular, about an inch long, formed of six distinct pieces, recurved at the extremity. Two narrow blueish bracts under each flower ..... 2. Blue-bell.

HABITATS AND LOCALITIES.

1. Lancashire Asphodel—(*Narthécium Ossifrágum.*)

Upon all the mosses near Manchester. Very plentiful and easily procurable upon Carrington Moss. Fl. July.

Curtis, iii. 477; E. B. viii. 535; Baxter, iii. 186.

One of the most beautiful plants the moorlands produce.

2. Blue-bell—(*Scilla nútans.*)

Everywhere in woods and groves, and in the greatest profusion, often rendering them quite blue for the fortnight that they endure. Fl. April, May.

Curtis, i. 90 (as *Hyacinthus non-scriptus*); E. B. vi. 377; Baxter, i. 74.

The prettiest view of blue-bells is early on a fine May morning, when the sun shines *under* the young leaves of the trees that overshadow them, and thus in between the blue and green, illuminating both. A white variety is not uncommon, and occasionally a flesh-coloured one occurs.

3. Wood Garlic—(*Allium ursinum.*)

Moist woods and groves, common. Abundant at the lower part of Mere Clough, in Gatley Carrs, the Woods near Arden Hall, &c. Brilliant and conspicuous from its snowy whiteness. Fl. May, June.

E. B. ii. 122; Baxter, ii. 97.

A plant that would be charming but for the unbearable odour. A flower placed in the midst of a bunch of forget-me-not, makes one of the sweetest mixtures of the season.

4. Snake's-head Lily—(*Fritillária Meleágris.*)

In a field near the river Bollin, below Cotterill (J. P.), and in meadows near Ratcliffe, plentiful every spring. (J. P.) Fl. May.

Curtis, i. 165; E. B. ix. 622; Baxter, i. 1.

Frequent in gardens, where the flowers often grow two or three together on the stem, and also vary to cream colour.

5. Common Star of Bethlehem—(*Ornithógalum umbellátum.*)

In fields between Bollington and Hagden Hall, far from any house, and in considerable quantity a few years since, but the ground has since been ploughed, and the plant obliterated, though probably not destroyed. (Mr. Leigh.) Meadows near Cheadle Bridge. (Baxter.) Fl. May.

Curtis, iii. 476; E. B. ii. 130; Baxter, ii. 124.

Common in gardens.

6. Solomon's Seal—(*Convallária multiflóra.*)

Railway bank at Sale. (Mr. Hunt.) Mottram. (Mr. Sidebotham.) Fl. May.

Curtis, iii. 478; E. B. iv. 279.

A handsome and very singular plant, common in gardens, especially in those of cottagers, where it is often seen growing in dense patches of twenty or thirty stems.

The garden and green-house Liliaceæ give to spring and early summer the half, at the very least, of their floral beauty. There are five principal tribes, distinguishable as follows:—

1. *Versatiles.* Flowers large and gaily coloured, the sepals and petals free, the filaments of the stamens thick and hard, but with fine drawn points on which the anthers are elegantly balanced or "versatile," so as to swing to and fro: fruit a dry capsule: roots bulbous or tuberous. Here belong the brilliant tulips,—varieties of the *Tulipa Gesneriána* and *Clusiána*, and the early fragrant species called the "Van Thol," or *Tulipa suavéolens;* also the "dog's-tooth violet," or *Erythrónium Dens-cánis*, the crown-imperial, and other species of the beautiful genus *Fritillária*, together with all the flowers legitimately called "lilies," or those of the genus *Lilium*, such as the large white *Lilium candidum*, or "garden queen," the orange-lily, the martagon, the Turk's-cap, and the superb Japan lily, or *Lilium speciósum.*

2. Day-lilies, or *Hemerocallideæ.* These have the calyx and corolla so united as to form a long and conspicuous tube, the extremities of the segments alone remaining free. The fruit is a dry capsule, and the roots are generally fibrous. The chief species are the day-lilies, *Hemerocállis fláva* and *H. cærúlea*, and the lovely *Agapánthus*, the flower-stalk of which rises two or three feet high, and bears a large blue umbel upon the summit.

3. *Hyacínthinæ.* These have the sepals and petals very slightly or not at all united, while the anthers are immoveable, the roots bulbous, and the fruit capsular. The matchless hyacinth, or *Hyacínthus orientális*, in its countless varieties; the deep-blue squills, or *Scilla bifólia, Scilla Sibírica, Scilla campanuláta*, &c., the grape hyacinth, the curious *Muscari*, the *Lachenálias*, and a second kind of Star of Bethlehem, called *Ornithogalum nutans*, (Curtis, iii. 475.) are the chief ornamental representatives. Onions, leeks, garlic, chives, and shallots, all of which belong to the genus *Allium*, hold an equally important place in the kitchen-garden. The *Allium Moly*, distinguished by its large umbels of yellow blossoms, occurs not infrequently in flower-borders.

4. Asphodels, or *Anthéricæ.* The flowers, anthers, and fruit in this section are like those of the *Hyacínthinæ*, but the roots are not bulbous. The only kinds in common cultivation are the *Anthéricum Liliástrum* and the *Anthéricum Liliágo*, both with star-like flowers of a pure white. *Narthécium Americánum* occurs in curious collections, and now and then the *Asphódelus ramósus.*

5. Berry-fruited, or *Convallaricæ.* The point of resemblance in this section consists in the genera having a berry for their fruit, instead of a dry and many seeded capsule, as in all the former. In other respects they differ widely, and

not only among themselves, but in certain genera, both from all the other Liliaceæ, and even from Endogens in general. The species grown for the sake of their flowers comprise the "lily of the valley," or *Convallária majális*, the Solomon's seal, above described, and one or two others of the same genus. With these, however, the liliaceous character ceases. In the asparagus, although the flowers are of the same type, the stem branches like a little fir-tree; and in the butchers' broom, or *Ruscus aculeátus*, (E. B. viii. 560.) a plant not uncommon in shrub-berries, it is not only branched, but hard and woody. The "leaves" of this curious shrub, (in reality small flattened branches) are oval, about an inch long, deep-green, entire, and sharply pointed; generally very numerous, and turned edgeways through being twisted at the base. The small white blossoms seem as if borne upon the middle of them, but are in fact each on a little pedicel which arises from the axil, and is closely adherent to the surface. The berries, which rarely ripen near Manchester, resemble tiny red cherries, like those of the asparagus.

Many other Liliaceæ occur in green-houses and hot-houses, including the curious succulent plants called *Aloes*, (many of which do well also in parlours) and the red-foliaged *Dracænas*. To the same family belong the *Yucca*, or Adam's needle, occasionally planted out on lawns; the New Zealand flax, or *Phórmium tenax;* the tuberose, or *Poliánthes*, and that charming East Indian climber, the *Gloriósa supérba*.

CXXVII.—THE ORCHIS FAMILY. *Orchidáceæ.*

The Orchis Family is without question the most extraordinary in nature. In England the species all grow in the earth, but the principal part of the tropical kinds perch themselves on the boughs and in the clefts of trees, obtaining their nourishment from the decaying matter casually collected about their string-like roots. To mark this peculiarity, and distinguish them from *parasites* (p. 163), the tree-inhabiting orchids are called *epiphytes*. No plants unfold flowers of more rare and marvellous beauty, or of forms more extraordinary and indescribable, or of odours more rich, or of colours more exquisite and vivid. In many cases the blossoms resemble insects, birds, or reptiles, whence they are called after the bee, the wasp, the lizard, the dove, the butterfly, and so forth. Several of these vegetable mimics reside in our own island. The distinguishing peculiarity of the structure of the Orchidaceæ is the blending of the stamens, style, and stigma into a single body, named the "column." The extreme irregularity and eccentric shapes of the perianth, and the inferior and twisted ovary, containing innumerable seeds that resemble the finest possible sawdust, combine with the "column" to form their universal character. One of the petals is generally in the form of a large and pendulous lower lip, and in this

part the colour and oddity of the flowers are chiefly eminent. In most species the two lateral stamens are abortive, and only the central one is perfect; but at times this condition is reversed. The anthers are variously situated upon the style, and the stigma appears as a viscid space in front. The pollen usually coheres in waxy masses, which are sometimes raised upon minute stalks. The roots, foliage, and inflorescence vary considerably.

These wonderful plants, of which there are probably three thousand species, grow in all parts of the world except the very coldest and the very driest. In temperate countries, where they are exclusively terrestrial, they ornament groves, meadows, and marshes with flowers like little hyacinths; in the hot damp woods of the tropics they are chiefly aërial, glorifying them with the highest splendours of natural jewellery. No plants more gratefully recompense the care of the florist, or impart so magic a beauty to our hot-houses. Requiring, however, special treatment, they do not mix well, ordinarily, with other flowers, so that the "orchid-house" is usually a distinct one. They go well with foreign ferns and Lycopodiums. Near Manchester the Orchidaceæ are cultivated to the highest perfection, and by no one more successfully than R. S. Yates, Esq., whose collection includes the following superb and uncommon species.

Aerides Brookii,
" quinquevúlnera,
Cáttleya supérba,
" lobáta,
" Walkeriána,
" labiáta,
Cœlogyne cristata,
Dendróbium alba-sanguíneum,
" Devoniánum,
Lælia purpuráta,
Oncídium Lanceánum,
Phalænópsis amábilis,
" grandiflóra,
Saccolábium guttátum,
" Blumeii,
Sophronitis grandiflóra,
Vanda suavis,
" tricolor,
Lycaste Skinneri, superba,
Odontoglóssum citrósmum.

Splendid collections of these lovely plants are possessed also by W. Turner, Esq.; Horatio Michols, Esq.; Samuel Ashton, Esq.; and Thomas Brocklehurst, Esq. A smaller but very pretty and select assortment of species is grown also by my friend James Brownell, Esq., Lymm, including several noble *Stanhopéas*, and that extraordinary plant the *Acropera Loddigesii*, the flower of which, inverted, presents the exact similitude of a donkey's head, with its eyes and long ears. Personally I must confess to a predilection for those two old-fashioned but unexcelled species, the yellow-panicled *Oncidium flexuósum* and the glorious white and violet *Dendróbium nóbile*.

Those who are fond of drawings may study these fine plants in two or three magnificent volumes at the Chetham Library. (See "Man-

chester Walks and Wild-flowers," chap. ix.) None of the family are cultivated in the open garden.

Thirty-five Orchidaceæ are inhabitants of Britain, thirteen of the number occurring near Manchester. The insectiform species, requiring a limestone soil, are not known here. The stems rise from six to eighteen inches high, and terminate in simple spikes or racemes of usually gay flowers. The leaves are parallel-veined, glabrous, undivided, and entire, generally lanceolate or oval, and the chief part of them radical. In two or three cases they are spotted with blackish-purple. The flowers are often provided with a slender tail or "spur," and usually have the long and pendulous lower lip, in which the variegation chiefly resides.

A.

Spike unilateral and spirally twisted, the flowers close together, diverging horizontally, small, greenish white, and very fragrant. Stem four to six inches high, bracteated. Radical leaves oblong, few, and small ..... 1. Lady's Tresses.

B.

Raceme unilateral, but not spirally twisted, long and lax, the flowers distant, drooping, rather large, and dingy greenish-purple. Stem one to two feet high. Leaves broadly ovate, stem-clasping, the upper ones lanceolate. Lower bracts longer than the flowers ..... 5. Broad-leaved Epipactis.

C.

Spike or raceme neither spirally twisted nor unilateral.

*

Plant leafless; the stem, which is about twelve inches high, being provided only with brownish sheathing scales. Flowers dingy brown. Root fibrous, resembling a little bird's-nest ..... 4. Bird's-nest Orchis.

**

Plant with green leaves.

I.—Leaves only two, opposite, sessile, and placed upon the stem at some distance from the ground. Flowers green. Roots fibrous.

Leaves oval, two to four inches long. Stem twelve to eighteen inches high. Raceme long and slender. Flowers numerous, distant, the lower lip deeply cleft ..... 2. Common Twayblade.

Leaves broadly heart-shaped, less than an inch long. Stem three to five inches high. Raceme short. Flowers very few, greenish-brown ..... 3. Small Twayblade.

II.—Leaves several; a portion or the whole of them radical.

Tail of the perianth very slender, and at least twice as long as the ovary. Flowers deliciously fragrant.

Flowers rather few, large, distant, greenish-white, the lip linear and entire. Stem twelve to eighteen inches high, angular. Radical leaves two, oblong-obovate, narrowed at the base. Tubers undivided ..... 11. Butterfly Orchis.

Flowers numerous, in a rather dense cluster, and of a uniform spotless crimson, or sometimes white, the lip in three equal and entire lobes. Stem one foot high. Leaves linear-lanceolate. Tubers palmate ..... 10. Fragrant Mountain Orchis.

Tail of the perianth (if any) not longer than the ovary.

Flowers yellowish-green, without any intermixture of red. Stem six to eight inches high. Lower leaves nearly ovate. Tubers palmate ..... 12. Green Mountain Orchis.

Flowers crimson, purple, or lilac, sometimes white; often speckled or mottled with darker crimson, or other colour.

Tail of the perianth nearly as long as the ovary.

Sepals converging into a helmet-like arch, and ribbed with green. Stem three to twelve inches high. Flowers few, the lip whitish, with large lilac spots ..... 6. Helmet Orchis.

Sepals spreading. Stems nine to eighteen inches high.

a. Raceme loose and open, two to five inches long. Flowers deep crimson, shewy. Leaves spotted with purple. Tubers two, egg-shaped ..... 7. Crimson Meadow Orchis.

b. Spike dense, with long green bracts under the flowers, making it look leafy. Tubers two, palmate ..... 9. Purple Marsh Orchis.

c. Spike dense, two to four inches long. Bracts short and inconspicuous. Flowers usually pale, and variously mottled with lilac or purple. Leaves spotted. Tubers two, palmate ..... 8. Common Mottled Orchis.

Tail of the perianth scarcely any. Stem six inches high. Spike one to two inches long. Flowers numerous, small, cream-coloured, fragrant.. 13. White Mountain Orchis.

HABITATS AND LOCALITIES.

1. Lady's Tresses—(*Spiránthes autumnális.*)

Wood near Castle Mill, Cotterill, on the left bank of the river, sparingly, four or five years ago. (Mr. Leigh.) Fl. September.

Curtis, ii. 279; E. B. viii. 541 (both as *Ophrys spiralis*); Baxter, i. 63

2. Common Twayblade—(*Listera ováta.*)

Moist shady woods and meadows, common. Abundant about Reddish, Marple, Broadbottom, Ashley, Cotterill, &c. Burley Hurst, Mobberley. Slope above Mere Clough reservoir. Fl. May, June.

Curtis, i. 205; E. B. xxii. 1548 (both as *Ophrys ovata*).

A singular and very pretty orchis, readily distinguished by the two large oval leaves upon the otherwise naked stem, about four inches from the ground, and the long and slender raceme of pure green flowers, the lip in two long, linear, parallel lobes.

3. Small Twayblade—(*Listera cordata.*)

Hilly pastures. Stalybridge Brushes, Fo-edge, and similar localities, but rather scarce. Fl. July.

Curtis, iii. 539; E. B. v. 358 (as *Ophrys cordata*).

4. Bird's-nest Orchis—(*Listera Nidus-avis.*)

In a thicket opposite Cotterill Wood. (J. P.) Wood near Tintwistle. (Mr. Sidebotham.) Fl. May, June.

Curtis, iii. 538; E. B. i. 48 (as *Ophrys Nidus-avis*); Baxter, v. 357.

Resembles a withered plant, or an overblown *Orobanche.* The fibrous roots are matted together like a bird's nest.

5. Broad-leaved Epipactis—(*Epipáctis latifólia.*)

Woods and shady hedgebanks, rather uncommon. Abundant in the Strines and Reddish Valleys. Cheadle. Styal. Prestwich. (J. P.) Mobberley. (Mr. Holland.) Ashley. (Mr. Hunt.) Fl. July, August.

Curtis, iii. 540; E. B. iv. 269 (as *Serápias latifólia*).

6. Helmet Orchis—(*Orchis Morio.*)

Meadows on the banks of rivers. Plentiful between Bowdon and Cotterill, about Jackson's Boat, and in the Reddish Valley. Astley, and near Winwick and Over Darwen, plentiful. (J. E.) Fl. May, June.

Curtis, i. 204; E. B. xxix. 2059.

7. Crimson Meadow Orchis—(*Orchis máscula.*)

Meadows and pastures near rivers, common. Abundant about Ashley meadows, between Ashley and Cotterill, and in the Reddish Valley. Flixton, on the banks of the Mersey. Fl. May, in company with the cowslip.

Curtis, i. 135; E. B. ix. 631.

A strikingly beautiful plant.

8. Common Mottled Orchis—(*Orchis maculáta.*)

Wet meadows, among long grass, and in boggy and swampy places, very common. Abundant by the side of Ridding's Brook, Lymm. Fl. May—July.

Curtis, iii. 528; E. B. ix. 632.

Easily recognised by the dense, pyramidal spikes of lilac or pinkish, but never crimson, flowers, the lip variously spotted, streaked, and variegated with deeper colours.

9. Purple Marsh Orchis—(*Orchis latifólia.*)

Moist meadows, rather rare. Ashley meadows. Meadows by Castle Mill. Near Jackson's Boat. In the Reddish Valley. Knutsford Moor. (Mr. Holland.) Fl. May, June.

Curtis, ii. 357; E. B. xxxiii. 2308.

Distinguished by the long green bracts among the flowers.

10. Fragrant Mountain Orchis—(*Gymnadénia conópsea.*)

In a pasture near Ashworth Chapel, discovered by Mr. William Horsefield, who brought it to his father. "Near Mottram." (B. G.) Fl. June. July.

Curtis, iv. 637; E. B. i. 10 (as *Orchis conopsea*); Baxter, vi. 409.

One of the most fragrant of our native orchids.

11. Butterfly Orchis—(*Habenária bifólia.*)

Moist meadows, not infrequent. Plentiful near Strines; at Burley Hurst, near Mobberley; and at Wilmslow, on the slope overlooking the Carrs, and opposite the Grange. (Thos. Chadwick's, Esq.) Fl. May, June.

Curtis, ii. 420; E. B. i. 22 (both as *Orchis bifólia*).

Deliciously fragrant, and remarkable for its long spur. "Butterfly Orchis" is, however, rather a far-fetched appellation. The plant that truly deserves the name is the *Oncidium Papilio* of Trinidad, common in good collections of Orchidaceæ.

12. Green Mountain Orchis—(*Habenária viridis.*)

Moist meadows and pastures, chiefly in the hilly districts. About Tintwistle; Wood-end, near Hyde, plentiful; Fo-edge; Greenfield (J. P.); Stalybridge Brushes; about Ringway. (J. P.) Fl. June, July.

Curtis, iii. 533; E. B. ii. 94 (as *Satyrium viride*).

13. White Mountain Orchis—(*Habenária álbida.*)

Grassy mountainous pastures. Tintwistle. Unsworth. (J. P.) Stalybridge Brushes. Fl. June.

Curtis, iii. 534; E. B. viii. 505 (as *Satyrium albidum*); Baxter, v. 387 (as *Peristylus albidus*).

Epipactis palustris (E. B. iv. 270.) and *Malaxis paludosa* (Curtis, iv. 638.) are inserted in Buxton's "Guide."

CXXVIII.—THE SNOWDROP FAMILY. *Amaryllideæ.*

In structure and beautiful appearance, the members of this family closely agree with the Liliaceæ. The only essential difference is in the position of the perianth and stamens with regard to the ovary,

Fig. 199.
Polyanthus-narcissus.

which here is "inferior" or underneath them. The stamens, except in the *Narcissus triandrus*, are always six. Very few species are found in northern Europe, but with every step southward the numbers increase, the maximum being in South America and at the Cape of Good Hope. A very large proportion are cultivated for the sake of their lovely flowers. There are in all about four hundred.

Five grow wild in England, two of them occurring near Manchester.

Both have bulbous roots, with annual and solitary flower-stems, bearing each a solitary blossom upon the summit.

1. Flower-stalks three to eight inches high; flower pendulous, bell-shaped, the sepals oblong, concave, and pure white; the petals half their length, white, the margins streaked with green. Leaves long, linear, few, rather glaucous, and scarcely developed till after the flowers have withered ..... } Snowdrop.

2. Flower-stalks nine to twelve inches high; flower large, half-pendulous, the sepals and petals equal in size, pale yellow, and more or less spreading, with a long projecting tube in the centre, of a deeper colour, and rather ragged at the edges. Leaves long, linear, and dark green ..... } Daffodil.

HABITATS AND LOCALITIES.

1. Snowdrop—(*Galánthus nivâlis.*)

Plentiful in meadows near Ringway. (J. P.) Abundant in the woods and on hedgebanks between Marple old Hall and the river. (Naturalized?) Fl. February, along with the hazle-nut.

Curtis, iii. 472; E. B. i. 19; Baxter, i. 33.

Very common in gardens, where the flowers are often double.

2. Daffodil—(*Narcissus Pseudo-narcissus.*)

Meadows and in groves, not uncommon. Abundant in a meadow between Prestwich Church and the dells beneath. In profusion by the side of Ridding's Brook, Lymm, opposite the dropping spring. The same in meadows near Marple Hall. Barlow Wood. Near Jackson's Boat. Near Arden Hall. Trafford Park, opposite Eccles Church, visible across the river. Very abundant at Mobberley, where the flowers are gathered for the Manchester market. Ratcliffe; Worsley; and many other places. Fl. April.

E. B. i. 17; Baxter, i. 73.

Very common in gardens, with the flowers *double*, and blooming a fortnight earlier than the single ones in the fields.

The pale narcissus, or *Narcissus biflorus*, (E. B. ii. 276.) formerly grew wild at Pilsworth, near Bury, but the ground is now cultivated, and the plant destroyed.

The garden Amaryllideæ comprise many pretty species of Narcissus, especially the white "poets'-narcissus," or *N. poeticus*, (E. B. iv. 275.) distinguished by the pink edge to its shallow cup; along with the same flower in the double condition, when it is carnation-like and very fragrant, and commonly called "Sweet Nancy." The

crinoline narcissus, or *N. Bulbocódium*, the *N. bicolor*, the *N. Jonquilla*, or jonquil, both single and double, and the *N. Tazetta*, or polyanthus-narcissus (Fig. 199), in many varieties, are also common. The last named is generally grown under cover, and a favourite plant for parlour culture. Besides these, there are the snow-flake, or *Leucojum æstivum*, (Curtis, ii. 315.) a rare indigenous species, resembling a gigantic snowdrop, with clustered flowers, and the sepals and petals all of the same size; and many superb flowers belonging to the genera *Crinum*, *Amaryllis*, *Pancratium*, and *Alstrœmeria*. The great American aloe, or *Agave Americana*, belongs to the same family.

CXXIX.—THE CROCUS FAMILY. *Iridáceæ.*

The inferior ovary of the Amaryllideæ is again found in the Crocus Family, but in company with only three stamens, the anthers of which are turned *outwards*. In most cases the Iridaceæ also present a very peculiar habit of foliage, the leaves being "equitant," or placed on opposite sides of the stem, and with their edges at right angles with the ground. These characters keep them perfectly distinct from the Liliaceæ, while from the Orchis Family they are distinguished by their uniformly regular flowers. They are natives principally of the Cape of Good Hope, a good many others growing in the middle parts of Europe and North America, and are remarkable, like their kindred, more for beauty of form than for economic properties. There are in all about five hundred.

Two species are reputed wild in England, but four of the genus *Crocus* are probably supposititious. Three out of the six genuine species occur near Manchester.

1. Flower-stems leafy, two to three feet high. Leaves equitant, broad, stiff, and erect. Flowers near the summit of the stem, large, erect, bright yellow, enriched with purple, and very handsome, the three larger segments elegantly curved outwards and downwards like the plumes of the Prince of Wales' feather. Stigmas three, resembling yellow petals ..... } YELLOW WATER-FLAG.

2. Leaves all radical, very narrow linear, six to eight inches long. Flowers purple, almost sessile among the foliage, tubular below, the upper portion in six large, elliptical, and nearly equal segments. Blossoms in spring, along with the young leaves ..... } PURPLE SPRING CROCUS.

3. Like the preceding, but the flowers produced in autumn, when the leaves of the current year are withered..... } AUTUMN CROCUS.

HABITATS AND LOCALITIES.

1. Yellow Water-flag—(*Iris Pseud-Acorus.*)

Ponds and marshes, abundant everywhere. Fl. June, July.

Curtis, i. 149; E. B. ix. 578; Baxter, ii. 82.

The tall, upright, sword-like leaves, and great golden *fleur-de-lis*, elegantly pencilled with deep purple, render this plant strikingly ornamental. It will grow in a dry garden, and is not infrequent in suburban ones, though much lacking in its native splendour for want of water.

2. Purple Spring Crocus—(*Crocus vernus.*)

Meadows by the side of the river at the Cheadle end of Northen Lane, flooding the ground with lilac; and the same in a meadow opposite the gable of Hough End Hall. (Mr. Knight.) Plentiful in a meadow belonging to Agecroft Farm, about three-quarters of a mile from Agecroft Bridge. (J. P.) Fl. March, April.

E. B. v. 344.

Formerly abounded in the fields near St. George's Church, Hulme, but now crushed to death by bricks and mortar.

Common in gardens.

3. Autumnal Crocus—(*Crocus nudiflorus.*)

In meadows, not uncommon. About Prestwich, above the Dells. Near Northen; Jackson's Boat; Thornham; Eccles (J. S.); Reddish (Mr. Hammond); Bramhall (Mr. Isaac Williamson); Thelwall, near Lymm, &c. Fl. September.

E. B. vii. 491; Baxter, ii. 137.

Often mistaken for the colchicum, or meadow saffron, but the latter has *six* stamens, whereas in the crocus there are only *three*.

In gardens there are grown numerous species of *Iris*, of all the colours of the rainbow, and immediately known by their equitant leaves and three immense petaloid stigmas, of the same colour as the perianth; many more of *Gladiolus* or sword-lily, soon told by their brilliant and rather irregular three-stamened flowers, in tall unilateral racemes; many varieties of *Crocus*, including the "cloth of gold," or *Susianus;* the gorgeous tiger-flowers, or *Tigridias;* and in green-houses beautiful *Ixias* and allied plants from the Cape of Good Hope.

CXXX.—THE COLCHICUM FAMILY. *Melanthaceæ.*

A small family, in figure somewhat liliaceous, but varying extremely in appearance, and different from all the preceding in having the carpels *separable*. The anthers open *outwards*, and the flowers are

often green and unisexual. Few families are so generally poisonous, the list being headed by the *Veratrums*, known by their large, oval, parallel-veined and strongly-ribbed leaves, and great pyramidal panicles of insignificant green flowers. Both the *V. album* and the *V. viride* are grown in gardens, along with some curious plants called *Uvularia*, and the celebrated colchicum, which last is reputed wild in our neighbourhood. The colchicum has broadly-lanceolate leaves, eight or ten inches long; and large, half-subterranean, long-tubed flowers resembling those of the purple crocus, but redder, and of a broken instead of uniform tint, with six instead of three stamens, and a superior ovary.

HABITATS AND LOCALITIES.

COLCHICUM—(*Colchicum autumnale.*)

"Near Middleton." (B. G.) Abundant in a field midway between Whalley and Accrington. (Mr. Leigh.) Fl. September, after the leaves of the current year are dead, the capsule being concealed in the ground during the winter, and making its appearance towards May, along with the foliage of the new season.

E. B. ii. 133; Baxter, i. 17.

CXXXI.—THE GINGER FAMILY. *Scitamineæ.*

Herbaceous plants, with large aromatic root-stocks, exclusively tropical, and generally speaking, of the highest floral beauty. The species most commonly cultivated is the common ginger-plant or *Zingiber officinale.* The leaves of the Scitamineæ are at once parallel-veined and feather-veined; that is to say, a strong midrib runs from the base of the leaf to the apex, with innumerable smaller veins flowing from it in close and perfect parallelism away to the margin, but although curving elegantly upwards, never converging, as in lilies, &c., to the point. This peculiarity distinguishes them from all other Endogens except the banana family and the arrow-root family, in both of which the veining is of similar character, but the bananas have normally five or six stamens, the greater part of which are always perfect, while here there is never more than *one* stamen, through the abortion of the remainder. The arrow-root family, or *Marantaceæ*, which agrees with them in imperfection of structure and in singular beauty, is kept apart by its want of aroma. The species commonly

cultivated belong chiefly to the genera *Canna*, *Maranta*, and *Calathea*, the latter esteemed for their velvety and painted foliage. Like the Scitamineæ, they are exclusively hot-house plants. These two families are illustrated in one of the finest volumes of coloured drawings of flowers ever produced, Roscoe's "Monandrian Plants," a copy of which enriches the Chetham library. (See "Manchester Walks and Wild-flowers, chap. ix.)

CXXXII.—THE PINE-APPLE FAMILY. *Bromeliáceæ.*

Handsome and very peculiar herbaceous plants, with hard, dry, and channelled leaves, often scurfy upon the surface, and spinous at the edge or point, and with their gay flowers in large panicles or racemes. They are natives exclusively of tropical America, and hence, like the Scitamineæ, &c., are in England never seen out of the hot-house. The species in cultivation comprise *Billbergias*, *Tillandsias*, *Pitcairnias*, and the splendid *Æchmea fulgens*, which is a blaze of scarlet and purple; and above all, the delicious pine-apple, or *Ananassa sativa*. The latter, requiring special treatment in order to ripen well, is generally grown in quantities by itself.

CXXXIII.—THE ALISMA FAMILY. *Alismáceæ.*

Aquatic and marsh plants, usually very elegant in appearance, the foliage and flowers generally rising to a considerable height above the surface of the water, and distinguished from all the preceding families by their free and usually numerous ovaries, without any tendency to unite. The stamens are hypogynous, and in combination with the other character, place the family in exactly the same relation to Endogens in general, that the Ranunculaceæ hold towards Exogens. The resemblance extends to the ripe fruit, some having many-seeded follicles; and others small, dry, and one-seeded achenia. The sepals are usually green; the petals of the ordinary texture; both parts trimerous, and the stamens usually numerous, though in a few cases only nine or six. The leaves are wholly radical; the flowers sometimes truly unisexual. About fifty species are known, natives of most of the northern and middle parts of the world. Nine grow wild in England, five of them occurring near Manchester.

A.—*Calyx and corolla both of a fine deep rose-colour.* Stem several feet high, bearing a large umbel of flowers upon the summit, the peduncles three to four inches long. Leaves linear, two to three feet long, erect, acutely three-edged, acuminate, more or less spirally twisted at the extremity. Stamens nine. 1. BUTOMUS.

B.—*Petals white or pale lilac; calyx green.* (Achenia one-seeded.)

- Flowers unisexual. Leaves large, truly arrow-shaped, acute, on long cellular stalks, the barbs lanceolate and acute. Flowers in an erect interrupted cluster, eight to twelve inches out of the water, white or a little rosy at the base, the three inner segments twice as long as the three outer ones. Stamens about twenty-four; pistils numerous; the female flowers fewer than the males, beneath them, and on shorter stalks..... 2. WATER ARROW-LEAF.
- Flowers bisexual. Carpels numerous and distinct.
  - Leaves ovate, acute, five to seven-ribbed, six to twelve inches long, on erect stalks of twice their length. Stems two to three feet high, much branched; the branches whorled in successive series, sub-divided, and forming a very large and handsome pyramidal panicle. Flowers numerous, terminal, solitary, pale lilac..... 3. COMMON ALISMA.
  - Leaves linear-lanceolate, attenuated at both extremities, three-ribbed, erect, on long stalks. Stems three to ten inches high, umbelled; the umbels often proliferous. Flowers few, pale lilac. 4. UMBELLED ALISMA.

THE ALISMA FAMILY.

C.—*Calyx and corolla uniform, and both green.* Leaves linear, fleshy, fœtid when bruised. Stems eight to ten inches high, terminating in a lax and simple spike of inconspicuous green blossoms. Anthers sessile. Stigmas feathery. Capsules nearly linear..... 5. MARSH TRIGLOCHIN.

HABITATS AND LOCALITIES.

1. Butomus—(*Butomus umbellátus.*)

Ponds and slow streams. Unsworth, near Whitefield, plentiful. (Mr. William Horsefield.) Ponds at Longford, on the right hand side of the road. Little Hulton. (R. H.) Boothstown and Drywood, Worsley, blooming so freely in 1857, that the mowers were attracted by its beautiful appearance, and with their scythes cut off the flowers to carry home. Fl. July, August.

Curtis, i. 29; E. B. x. 651; Baxter, i. 34.

One of the handsomest plants our country produces, and well known under its erroneous name of "Flowering-*rush*." It is grown in the ornamental water at the Botanic Gardens.

2. Water Arrow-leaf—(*Sagittária sagittæfólia.*)

Slow streams and canals. In the canal at Abraham, near Leigh, abundant; also in the old canal at Worsley, near Botany-Bay Wood; and in the reservoir by Mr. Norbury's Factory Lodge, Atherton. (J. E.) Fl. July, August.

E. B. ii. 84; Baxter, ii. 109.

A plant of remarkable beauty, and affording the finest example in nature of the arrow-headed leaf. It blooms along with the Butomus at the Botanic Gardens.

3. Common Alisma—(*Alisma Plantágo.*)

Ditches and on the borders of shallow ponds, abundant everywhere. Fl. August.

Curtis, ii. 319; E. B. xii. 837; Baxter, v. 337.

Conspicuous and highly ornamental, both in its large leaves and spreading panicle of flowers. Usually called by the misleading name of "Water-*plantain*."

4. Umbelled Alisma—(*Alisma ranunculoides.*)

Ponds and very slow-moving streams, rare. Baguley, and near Timperley Bridge. Fl. July, August.

Curtis, iii. 484; E. B. v. 326.

5. Marsh Triglochin—(*Triglochin palústre.*)

Low, wet, boggy places, not uncommon. Hale Moss. Near Arden Hall. Near Agecroft. Mobberley, near Burley Hurst Wood. Plentiful in Clayton Vale and about Thornham. Fl. June—August.

Curtis, iii. 482; E. B. vi. 366; Baxter, i. 60.

The beautiful *Limnócharis Humbóldtii* of California, not infrequent in greenhouses where aquatics are cultivated, flourishes in the same reservoir as the water arrow-leaf, encouraged by the kindly action of the warmth from the engine-house.

CXXXIV.—THE FROGBIT FAMILY. *Hydrocharídeæ.*

Beautiful aquatics, the flowers unisexual, enclosed in a peculiar sheath-like cover called a "spathe," and going through all the stages of their existence below the surface of the water, except at the period of the fertilization of the pistil, when they are raised into the air for a few hours. Sepals three; petals three, sometimes absent; stamens usually numerous, and seated, along with the perianth, on the summit of the ovary. There appear to be about twenty species, the fresh waters of Europe, North America, Egypt, the East Indies, and New Holland containing the greater part, while a few grow in estuaries of the sea.

Two are natives of Britain, and both grow wild, or as colonists, near Manchester.

1. Leaves sword-shaped, six to twelve inches long, succulent, acute, with a prominent midrib, and pungent marginal prickles, and growing in dense, erect, aloe-like tufts upon the surface of the water, to which they are thrown up from creeping runners that penetrate far into the mud. Flower-stalk from the centre of the tuft, four to six inches long, flattened and two-edged, and supporting a spathe formed of two bracts about an inch in length, inside of which are several large, white, and peduncled male flowers, and a solitary and sessile female. The former have twelve to twenty stamens; the latter has six pistils. The flowers are sometimes imperfectly diœcious, and sometimes bisexual .....WATER SOLDIER.

2. Stems slender and floating; at intervals bearing tufts of kidney-shaped or circular leaves, one and a half to two inches across, purplish underneath, petiolate, smooth, and fleshy, and which lie flat upon the surface of the water, with abundance of long and thick white rootlets descending at the same places. Flowers in small umbels from the bosom of the leaves, nearly an inch across, white, except the centre, which is yellow; the males two or three together, with three to twelve stamens; the females *on separate plants*, with six styles and two-cleft stigmas, the peduncles of both surrounded by membranous and pellucid spathes .....FROGBIT.

HABITATS AND LOCALITIES.

1. WATER SOLDIER—(*Stratiotes aloides.*)

Ponds, lakes, and meres, not uncommon. Abundant in Radnor Mere, Alderley Park, and in the sheet of water in Spring Wood,

Booth, near Knutsford. Ponds about Whitefield and Thornham. (J. P.) Bramhall. (Mr. Isaac Williamson.) Leigh and Tyldesley. (J. E.) Atherton and Little Hulton. (R. H.) Pits in Eccles fields, plentiful, and in a pit near Slack Lane, Eccles. (J. S.) Fl. July, August.

E. B. vi. 379; Baxter, vi. 413.

A very remarkable plant, and one of very rapid growth, completely hiding the water, if allowed to spread undisturbed for a few years. The "Infirmary pond," itself a thing of the past, was covered with it twenty-five years since; as was likewise the pond on the site of which Platt Church now stands.

2. Frogbit—(*Hydrócharis Morsus-ránæ.*)

Ponds and slow-moving waters, rather uncommon. Ponds at Longford, with the *Butomus*. Common at Tyldesley. (J. E.) "Ponds at Bowdon," (introduced?) Ponds in Eccles fields, so completely roofed over with it that a rat could run across without getting wet-footed. (J. S.) Fl. July, August.

Curtis, i. 209; E. B. xii. 808; Baxter, vi. 441.

A charming little plant, in general figure a pigmy water-lily, and excellently suited for the aquarium.

In addition to these two indubitable natives, there is now very abundantly naturalized in ponds and slow streams, the "Canadian water-weed," or *Anácharis Alsinástrum*. The stems of this curious invader are wholly submerged, very slender, much branched, and clothed with small and sessile leaves, which are about three-fourths of an inch in length, and usually three together. The flowers grow in the axils of the upper leaves, and often have the slender perianth-tube elongated two or three inches, so as to reach the surface of the water, where it terminates in three or six small and spreading segments. Female plants alone are known in this country as yet. The Anacharis was first noticed in England in 1842. Since then it has spread rapidly, and in some parts has become a terrible weed, choking up water-courses and canals. It occurs about Sale, Longford, Ashton-upon-Mersey, Withington, Bradford, Middleton, Boothstown, Latchford, and in many other places. Along with the beautiful *Vallisneria*, which is also a member of the *Hydrocharideæ*, it makes a charming aquarium plant. The *Vallisneria* is known by its very long, narrow, bright grass-green leaves, like transparent ribbons ascending from the bottom of the water towards the surface. If a glass jar containing a root of it be placed in a hot-bed, it will flower prettily.

CXXXV.—THE PALM-TREE FAMILY. *Palmáceæ.*

The palm-trees, styled by Linnæus, the "princes of the vegetable kingdom," are at once the largest and noblest of Endogenous plants,

and the most interesting and majestic productions of floral nature. Their towering and usually unbranched stems shoot far above the ordinary forest-tree; the gigantic leaves that crown their summits are like boughs; and the abundance of their blossoms and fruits is vast almost beyond counting. A single spatha of the date-palm contains above twelve thousand blossoms, and every branch of the sejé-palm of the Orinoco bears eight thousand. The variety of their service to man, as donors of food, raiment, and useful household articles is on a par with their splendour as trees, and in tropical regions gives them an importance superior even to that of the corn-fields of our own country. Dates (the produce of the "palm-tree" of Scripture), coco-nuts, sago, coco-nut matting, vegetable ivory, of which every lady's work-box now contains some pretty carved specimen, palm-oil, the brooms used by our city scavengers, and the brushes of Mr. Whitworth's patent street-sweeping machines, are but a few of the every-day articles that come from palm-trees, while the stems of the *Calamus* furnish schoolmasters with that fine alterative and stimulant medicine called the cane. Tropical countries are almost the only seats of the growth of palm-trees, no species occurring nearer England than the extreme south of France, where they cease with the little fan-palm. Hence they are only seen with us in hot-houses, and near Manchester scarcely at all except at the Botanic gardens, where there are small specimens of several interesting species. For particulars respecting this superb and inestimable family the student may consult Dr. Seeman's "Popular History of the Palms and their allies," an excellent and cheap little volume.

CXXXVI.—THE BANANA FAMILY. *Musáceæ.*

Splendid herbaceous plants resembling palms in figure and foliage, and agreeing with them as to uses and native countries. All books that treat of tropical life and adventure have something to say about the fruits called the "plantain" and the "banana," or about the value of their leaves and fibre, the latter of which is the material of the finest India muslins. Every good green-house has its specimen of the *Musa Cavendishii*,—a noble plant, with a tall, straight, thick stem, several feet in height, with a crown of prodigious leaves, that arch away from it magnificently, and a drooping cluster of crimson flowers, which changes, in due course, into an enormous bunch of fruits, resembling Windsor beans, but cylindrical, and filled with sweet pulp.

In opulent collections there are other superb plants of this family called *Heliconia* and *Strelitzia*.

CXXXVII.—THE SPIDERWORT FAMILY. *Commelynáceæ.*

A few beautiful garden flowers of liliaceous aspect are all that represent the Commelynaceæ about Manchester. The commonest is the Spiderwort, or *Tradescantia Virginica*, distinguished by its numerous succulent stems, rising in clumps a foot or more in height; abundant grass-like leaves, and terminating and sessile umbels of numerous white, rose-coloured, or violet flowers. The calyx consists of three green sepals; the corolla of three large round petals, altogether an inch across; the six stamens are densely covered with beaded hairs of the same colour as the petals, and are tipped with large, square, golden-coloured anthers. The other species in cultivation belong to the genus *Commelyna*.

CXXXVIII.—THE PONDWEED FAMILY. *Naiadáceæ.*

Aquatic plants with long and slender stems, either wholly submerged, or floating upon the surface of the water. Leaves numerous, varying in shape from linear to oval, alternate or opposite, petiolate or sessile, and either sheathing at the base or accompanied by sheathing stipules. Flowers inconspicuous, greenish, usually in spikes an inch or two long, and elevated slightly and vertically above the surface of the water; occasionally axillary and solitary, and in some cases unisexual. Perianth in four small segments, sometimes absent altogether; stamens usually four, sometimes only two or one; ovaries and stigmas of the same number. The tetramerous flowers distinguish these plants from all other aquatic Endogens; and the parallel-veined leaves prevent their being confounded with tetramerous Exogens. Fifty or sixty species only are known, yet few parts of the world are without their presence. A few belong to the sea.

Twenty-two species are reputed wild in England, seventeen of them being *Potamogétons*, but the genuine species of the latter are probably only ten, reducing the total native representatives to fifteen. Eight of the fifteen grow near Manchester.

THE PONDWEED FAMILY.

- **A.—Flowers in pedunculated spikes or clusters, and bisexual.**
  - Upper leaves stalked, and floating on the surface of the water, two or three to six inches long, and usually much larger than the submerged ones, which are also different in form.
    - Leaves thick and opaque, oval; the petioles usually longer than the blade. Lower submerged leaves stalked, or reduced to petioles ..... 1. Common Pondweed.
    - Leaves thin and translucent, lanceolate, reddish-olive colour; lower submerged leaves sessile or nearly so, membranaceous, many-nerved ..... 3. Brown Pondweed.
  - Leaves all submerged and sessile, and all of the same shape.
    - Leaves amplexicaulent, broadly heart-shaped, seven-nerved, green, and pellucid ..... 4. Perfoliate Pondweed.
    - Leaves not amplexicaulent, lanceolate or linear, tapering at the base.
      - Leaves broadly linear or lanceolate, two to five inches long, pellucid.
        - Leaves strongly waved, obtuse, one to three-nerved. Spikes small. Flowers three to six .. 5. Crisp-leaved Pondweed.
        - Leaves flat, entire, many-nerved. Spikes dense and cylindrical .. 2. Shining Pondweed.
      - Leaves narrow linear, three-nerved. Stems thread-like.
        - Leaves dilated at the base into a sheath ..... 7. Pectinated Pondweed.
        - Leaves not so dilated ..... 6. Small Pondweed.

- **B.—Flowers axillary, sessile, and monœcious. Stems very long, slender, and branched. Leaves usually opposite, finely linear, one to two inches long, and bright green** ..... 8. Zannichellia.

HABITATS AND LOCALITIES.

1. Common Pondweed—(*Potamogéton natans.*)

Pools, ponds, and stagnant waters, everywhere; covering them during summer with its broad flat leaves, among which in July, there are innumerable spikes of flowers. The leaves, like those of the nasturtium, resist wet, and though floating on the water, are always quite dry, at least on the upper surface.

E. B. xxv. 1822; Baxter, v. 350.

About Lymm this plant is called "flatter-dock." A small variety of it is distinguished by some under the name of *Potamogeton oblongus.* (E. B., Supp. iii. 2849.) The latter grows on Hale Moss, about Dunham, Lindow, and in many other places.

2. Shining Pondweed—(*Potamogéton lúcens.*)

Rostherne Mere, plentiful. Ponds about Chorlton and Stretford. Worsley. (J. E.) In profusion in one of the ponds near the Hall in Dunham Park. Fl. June, July.

E. B. vi. 376.

3. Brown Pondweed—(*Potamogéton ruféscens.*)

Common in ponds about Old Trafford, Chorlton, Altrincham, and generally near Manchester. Fl. July, August.

Curtis, iv. 589.; E. B. xviii. 1286 (both as *Potamogéton flúitans*).

Probably not distinct from *P. lucens*, from which there is little to distinguish it beyond the floating upper leaves and their brownish hue. This is the plant referred to in the "Flora Mancuniensis," p. 14, under the name of "*P. heterophyllus.*"

4. Perfoliate Pondweed—(*Potamogéton perfoliátus.*)

Rostherne Mere. Canal near Monton Green. Abundant in the canal at Worsley. (J. E.) Little Hulton. (R. H.) Fl. July, August.

E. B. iii. 168.

A very elegant species.

5. Crisp-leaved Pondweed—(*Potamogéton crispus.*)

Ponds, canals, and slow-moving waters, common. Water in Agecroft Park. Reservoir at the foot of Mere Clough. Chorlton. Sale. Old Trafford. Very abundant in the large pond opposite Heywood's Farm, Dunham Park. The whole pond is fringed with it for a distance of eight or nine feet. Fl. June, July.

Curtis, ii. 307; E. B. xv. 1012 (the leaves too much lobed).

Very beautiful and curious in its foliage, though inferior to the *P. lucens.*

6. Small Pondweed—(*Potamogéton pusíllus.*)

Ponds and streams, not uncommon. Stretford; Chorlton; Withington; Hale Moss. Fl. July.

E. B. iii. 215.

Potamogéton compressus, (E. B. vi. 418.) common at Tyldesley, on Hale Moss, and about Chorlton and Old Trafford, differs from this only in its broader leaves.

7. Pectinated Pondweed—(*Potamogéton pectinátus.*)

Abundant in the canal at Lymm, and at Worsley; and profusely in the stream that runs into Rostherne Mere, along with *natans*, *perfoliatus*, and *crispus*. Fl. July.

E. B. v. 323.

8. Zannichellia—(*Zannichéllia palústris.*)

Heaton Park, in one of the old pits called the Damsteads, where it was first gathered by Mr. John Shaw, forty years ago. Probably not rare. Fl. July. Annual?

E. B. xxv. 1844.

CXXXIX.—THE ARUM FAMILY. *Aráceæ.*

A little family of plants mostly herbaceous, tropical, and poisonous, and remarkable in the few species hitherto discovered, either for the beauty of their foliage, or for the extremely curious conditions of their inflorescence. The flowers, which are in all cases minute, are disposed upon the surface or at the base of a peculiar club-like stalk called a "spadix," the latter being usually enclosed, or at least while young, in a large and peculiar leaf called a "spathe." They are unisexual and monœcious, destitute of perianth, and generally very numerous. The leaves, unlike those of Endogens in general, are net-veined, usually hastate and petiolate, and occasionally divided in a palmate manner. One species is indigenous, and belongs to the Manchester Flora,—the curious plant known to country children under the name of "lords and ladies." The leaves are radical, petiolate, arrow-shaped, two to five inches long, pointed, very smooth and glossy, and frequently splashed with purple spots. The flower, with its investing spathe, appears at first in the form of a little green obelisk, four or five inches high, tapering to a point at the summit, and contracted, like a waist, near the base. By degrees the spathe uncurls, disclosing when quite open, a beautiful crimson or purple club, about two inches long, and the thickness of a quill, over which it arches like a canopy. At the base of the club, which here tapers into a delicate stalk, and is concealed by

the unexpanding part of the spathe, there is a zone of fine white hairs. Underneath this there is a dense band of sessile anthers, of a reddish-purple colour; and below this again a band of pale yellow and sessile ovaries, resembling little beads. The club, which is sometimes of a pretty buff colour, when it is called a "lady," is merely ornamental. As the summer advances, the leaves, spathe, and club die away and disappear, and the ovaries grow into scarlet berries the size of currants, the entire cluster being as large as a walnut, and of similar form.

HABITATS AND LOCALITIES.

COMMON ARUM—(*Arum maculátum.*)

In all the woods about Ashley and Cotterill abundant. Plentiful also in Newbridge Hollow, between Bowdon and Rostherne; about Lymm, especially towards Thelwall; and in the Reddish Valley. Sparingly about Prestwich. Fl. May. Berries ripe in August, when the foliage is decayed.

Curtis, i. 136; E. B. xix. 1298; Baxter, iv. 261.

The most remarkable of our indigenous plants. (See "Walks and Wild-flowers," p. 30.)

Few of the Araceæ are grown for ornament. The *Arum triphyllum* and *A. trilobatum* are sometimes seen, and more rarely the extraordinary plant called the "Dragon Arum," or *Arum Dracúnculus*, the leaves of which resemble those of the hellebore, while the stem is spotted with purple. The favourites of the family are the splendid *Caladiums*, the leaves of which are often beautifully coloured, and usually of great size. The *Caládium bícolor* is one of the showiest hot-house plants in cultivation.

CXL.—THE BULRUSH FAMILY. *Typháceæ.*

Herbaceous plants, growing in ditches, ponds, and swamps, with long, linear, grass-like, and stiff but pliant leaves; and stout cylindrical stems, which are jointless and succulent, and two to four or five feet high, unless submerged. The latter condition is unusual; in general the stems are elevated considerably. Flowers unisexual, monœcious, small, and incomplete, but clustered into dense globular heads, or cylindrical spikes, that in either case show conspicuously. Spathe absent; petals absent; sepals three or six, and very minute, sometimes a mere bundle of hairs. Stamens three or six in each flower, usually with long and thread-like filaments. Ovary single, tapering into a slender and simple style. Fruit a small dry achenium, one-celled and

one-seeded. There are only two genera comprised in this family, and perhaps not more than a dozen species, though very generally diffused in the northern parts of the world. Six are accounted wild in Britain, Manchester possessing five of them.

A.

Flowers in dense cylindrical spikes, which are a foot or more in length, resembling clubs, the upper or male half formed of innumerable yellowish anthers; the lower or female half of innumerable minute ovaries, packed as closely as the stamens, and enveloped in tufts of soft brownish hairs, which render the mass velvety both to the eye and to the finger.

1. Spike uninterrupted, the male portion commencing immediately upon the termination of the female. Leaves flat. Stems two to five feet high. Club an inch in diameter ..... COMMON BULRUSH.

2. Upper or male half of the spike separated from the female portion by about an inch of naked stem. Leaves somewhat concave in front. Whole plant smaller and slenderer than the preceding ..... SMALL BULRUSH.

B.

Flowers in dense globular heads, which vary from half an inch to an inch in diameter, and are disposed rather distantly upon the upper portion of the plant, so as to form a small panicle or raceme. Upper heads all male, the stamens with long, white, flaccid filaments; the lower heads all female, larger than the males, and composed of a number of firm, green, sessile, pointed, and prominent ovaries. Leaves shooting considerably above the inflorescence.

3. Stem two feet high, the flowering portion branched, and every branch bearing several heads ..... COMMON WATER-BURR.

Stem simple.

4. Stem and leaves erect, rising out of the water.. SMALL UNBRANCHED WATER-BURR.

5. Leaves floating, pellucid. Flower-heads very few, the male generally solitary..... FLOATING WATER-BURR.

HABITATS AND LOCALITIES.

1. COMMON BULRUSH—(*Typha latifolia.*)

Ponds and marshy places, common. Abundant on the borders of Rostherne Mere, and of Mere Mere. Pond in Ashley Wood. Sale. Cotterill. High Legh. Fl. July.

Curtis, i. 206 (as *Typha major*); E. B. xxi. 1455.

2. SMALL BULRUSH—(*Typha angustifolia.*)

Similar situations, but less common. Rostherne Mere. Mere Mere. Longsight. Chorlton fields. Fl. July.

Curtis, i. 207 (as *Typha minor*); E. B. xxi. 1456; Baxter, v. 377.

3. Common Water-burr—(*Spargánium ramósum.*)
Ponds and ditches, everywhere. Fl. July, August.
Curtis, ii. 358; E. B. xi. 744.

4. Small unbranched Water-burr—(*Spargánium simplex.*)
Similar situations, tolerably common. Plentiful on Hale Moss. Fl. July, August.
Curtis, ii. 359; E. B. xi. 745; Baxter, iv. 276.

5. Floating Water-burr—(*Spargánium natans.*)
Ponds, ditches, and stagnant waters, common, but seldom found in flower. In 1857 it blossomed abundantly in the canal between Monton Bridge and Worsley; and in a brook between Worsley and Alder Forest it blossoms frequently. Fl. July.
E. B. iv. 273.

CXLI.—THE RUSH FAMILY. *Juncáceæ.*

Herbaceous plants, often much resembling grasses, but with pretty star-like flowers that indicate a near relationship to the liliaceous families. Stems generally rigid, straw-like, and unbranched, and in the true rushes, or genus *Juncus*, provided with distinct pith, a circumstance anomalous among Endogens. In many species of the same genus they terminate in points as sharp as needles. Leaves either cylindrical, very long and slender, and hollow, or nearly so; or flat, linear, and tapering, like those of grasses. Sometimes they are undeveloped, existing only in the rudimentary form of dark-brown or blackish scales which sheathe the base of the stem. Inflorescence variable, but most frequently an irregular panicle or umbel, which is either terminal or lateral. Calyx and corolla forming a regular six-parted perianth, which is ordinarily dry, and of a deep-brown or greenish colour. Stamens six, rarely only three; ovary solitary and free; stigmas usually three; fruit a triangular capsule, usually three-celled, few or many-seeded, and surrounded by the permanent perianth.

Nearly two hundred species are known, chiefly inhabiting the colder parts of the world, and some of them the very coldest. They are in many cases of considerable utility, as happens with the common rushes of our own country, so valuable to the chair-maker and to the candle-maker. Twenty-seven are esteemed British, thirteen of them growing near Manchester, but the real number is probably not above twenty-one, Manchester possessing ten.

- **A.—Leaves, if present, cylindrical, or at least at their tips, destitute of white hairs, and usually stiff. Capsules with numerous minute seeds. (Genus *Juncus*.)**
  - Flower-stems leafless, but with rudimentary scales at the base.
    - Stems two to three feet high. Panicles lateral, about half-way up the stem.
      - Stems soft, pliable, pale green, very faintly striated ..... 1. Common Hard Rush.
      - Stems stiff, tough, rigid, glaucous, and deeply striated ..... 2. Common Soft Rush.
    - Stems three to eight inches high. Panicle terminal. Leaves short, exceedingly rigid, grooved, and spreading in a rosette-like manner.. 3. Heath Rush.
  - Flowering stems with leaves upon them.
    - Leaves hollow, with internal cross partitions. Panicle terminal, Stem two or three-leaved.
      - Segments of the perianth more or less pointed. Stem and leaves flattened ..... 4. Common Jointed Rush.
      - Segments of the perianth all obtuse. Stem and leaves rounded..... 5. Blunt-flowered Jointed Rush.
    - Leaves without internal partitions. Stems four to six inches high, numerous, tufted, dichotomous. Flowers solitary. Whole plant very pale and weak ..... 6. Toads' Rush.
- **B.—Leaves soft, flat, linear, and grass-like, usually fringed with long white hairs, especially at the base. Capsules with three large seeds. (Genus *Luzula*.)**
  - Flowers in loose panicles.
    - Peduncles two to three-flowered. Stems stout, eighteen to twenty-four inches high. Panicle four to twelve inches in diameter. Leaves broad, shining, densely tufted, yellowish green. Capsules pointed.. 7. Great Wood Rush.
    - Peduncles one-flowered, reflexed when in fruit. Stems weak, slender, six to twelve inches high. Leaves narrow and weak. Capsules obtuse 8. Common Wood-rush.
  - Flowers in compact round heads.
    - Heads three to six, mostly on peduncles an inch long. Stems three to nine inches high, usually solitary, or but few together. Flowers blackish-brown ..... 9. Meadow Wood-rush.
    - Heads almost always consolidated into a round cluster. Stems nine to eighteen inches high, very slim, and usually much tufted. Flowers light brown ..... 10. Heath Wood-rush.

THE RUSH FAMILY.

HABITATS AND LOCALITIES.

1. Common Hard Rush—(*Juncus glaucus.*)

Everywhere in low wet places and by waysides. Fl. July, August.

E. B. x. 665.

2. Common Soft Rush—(*Juncus commūnis.*)

Ditches, pondsides, and in marshy ground, everywhere. Fl. July, August.

Of this common but beautiful plant there are two extreme conditions, one with large loose panicles two to four inches in length and breadth, and rather pale-coloured; the other with the flowers densely packed together in clusters of about an inch in diameter, and usually of a deep-brown. The former is usually called *Juncus effusus*, and figured under that name in E. B. xii. 836: the other is distinguished as the *Juncus conglomerátus*, and figured as such in E. B. xii. 835. Intermediates of every grade of transition between these two forms may be collected in the course of a few summers.

3. Heath Rush—(*Juncus squarrósus.*)

Barren sandy moors and heathy ground, common. Lindow Common. Kersall Moor. Cobden Edge, near Strines. Rooley Moor, between Rochdale and Rawtenstall, in the greatest abundance. Fl. July.

E. B. xiii. 933.

The stem is not invariably naked; a solitary leaf is sometimes produced at a short distance above the ground.

4. Common Jointed Rush—(*Juncus acutiflórus.*)

On the edges of ponds, in ditches, especially where muddy, in swamps, on wet moors, and even in dry ground, common everywhere. Fl. Summer.

E. B. iv. 238 (as *Juncus articulátus*).

One of the most variable of our native plants, but always readily told by the characters above-mentioned. The peculiar knotted or jointed feel of the leaves when passed between the finger and thumb, would distinguish it, except from the following species, even to a blind man. The most beautiful of its varieties is the plant commonly called the shining-fruited rush, or *Juncus lamprocarpus* (E. B. xxx. 2143; Baxter, v. 399), which has capsules of a fine polished black or purplish-brown, those of the common form being pale and greenish. It is also rather smaller in stature. Another very pretty variety is the little bog-rush, or *Juncus uliginosus* of E. B. xii. 801, which is only a few inches high, and with panicles

very slightly branched, and often viviparous, or producing young plants among the capsules. The latter is often found floating on shallow water, covering the surface with a tangled mass of leaf and stem. The *lamprocarpus* is almost as common as the normal form of the plant, but generally grows in drier ground; the *uliginosus* is abundant on Hale Moss, and in most places of similar nature.

5. Blunt-flowered Jointed Rush—(*Juncus obtusiflórus.*)

Wet places, like the preceding, but much less frequent. Abundant on Hale Moss. Pondsides at Levenshulme. Fl. July, August, later than the *acutiflorus*.

E. B. xxx. 2144.

Easily distinguished by its cylindrical leaves and pale and entangled panicle, the last divisions of which are much reflected.

6. Toads' Rush—(*Juncus bufónius.*)

Moist, low, swampy, and barren ground, especially such as lies under water during winter, common. Fl. July, August.

E. B. xii. 802.

7. Great Wood-rush—(*Lúzula sylvática.*)

Woods in the hilly districts, plentiful. Ashworth Wood. Bredbury Wood. Near Clifton Aqueduct. Fl. May, June.

Curtis, ii. 318; E. B. xi. 737 (both as *Juncus sylvaticus*).

A remarkably handsome and graceful plant.

8. Common Wood-rush—(*Lúzula pilosa.*)

Everywhere in woods and cloughs, one of the earliest flowers of spring, but unpretending, and liable to be overlooked. Fl. March—May.

Curtis, ii. 317; E. B. xi. 736 (both as *Juncus pilosus*).

9. Meadow Wood-rush—(*Lúzula campéstris.*)

Dry meadows and pastures, everywhere, often growing among the young hay-grass. Fl. April, May.

Curtis, i. 91; E. B. x. 665 (both as *Juncus campestris*); Baxter, v. 379.

Like the *pilosa*, one of the earliest flowers of spring, and conspicuously distinguished from the vernal grasses, with which it is generally associated, by the deep brown of its flower-buds. The blossoms, when open, are of a beautiful star-like figure, and have large yellow anthers.

10. Heath Wood-rush—(*Lúzula congésta.*)

Moors and heathy places, also by pond-sides and in woods, but never among hay-grass, common, though by no means universal, as the *campestris* is. Fl. June, a month or six weeks later than the preceding.

E. B., Supp. ii. 2718.

Many botanists regard this plant as a variety of the *L. campestris.* I am disposed to consider it a good species. It is considerably taller, and generally much tufted, blossoms several weeks later, and has flowers of a delicate light brown, instead of blackish. Near Manchester, at least, there never occur intermediate forms.

The hairs on the stems and leaves of all these species of Luzula hang about them in a very curious manner, looking as if left behind by some furry animal.

CXLII.—THE DUCKMEAT FAMILY. *Lemnáceæ* or *Pistiáceæ.*

Minute aquatics, known in England only in the common duckmeat, and three other species of the same genus. They are the simplest, not only of Endogens, but of all flowering-plants whatever, consisting of nothing more than thin green plates of cellular tissue, which float horizontally upon the surface of stagnant water, the plates either growing separately or cohering two or three together by their edges, and with long hair-like roots hanging from their under surfaces. The multiplication of the plates is rapid and constant, so that the pond or other water which they inhabit is usually covered with an even green carpet. The flowers are put forth, like the buds, from the margins of the plates, and consist of nothing more than a delicate membranous bag, two stamens, and a solitary ovary.

A.

1. Roots growing in clusters. Plates broadly ovate or circular, about a quarter of an inch across in their longest diameter ..... } Great Duckmeat.

B.

Roots solitary, *i. e.*, only one root to each plate.

*

2. Plates long and narrow, very thin, minutely toothed at one end, and tapering into a little stalk at the other, with two young ones usually growing from opposite sides, near the base, and at right angles with the principal plate ..... } Ivy-leaved Duckmeat.

**

Plates broadly oval or egg-shaped.

3. Plates flat, thin, scarcely convex underneath ..... Common Duckmeat.
4. Plates thick, spongy, and almost hemispherical underneath.. Gibbous Duckmeat.

HABITATS AND LOCALITIES.

1. Great Duckmeat—(*Lemna polyrhiza.*)

Ponds and stagnant waters, rather uncommon. Ponds behind the Art Treasures Exhibition site. Seaman's Moss Pits, abundant, and in the canal not far off. Styal. Bowdon. Near Jackson's Boat. Pond near Mill Bank, Poynton, abundant. (W. H. Heyes, Esq.) Fl. summer, but very rarely.

E. B. xxxv. 2458.

2. Ivy-leaved Duckmeat—(*Lemna trisúlca.*)

Similar situations, not rare. Old Trafford; Bowdon; Chorlton; Withington; Seaman's Moss Pits. Longford, in the same pits as the *Hydrocharis*, exceedingly abundant. Fl. as *L. polyrhiza.*

Curtis, iii. 439; E. B. xiii. 926.

3. Common Duckmeat—(*Lemna minor.*)

Covers every stagnant pond with a close film of minute green spangles. Fl. summer, but not commonly.

Curtis, iii. 440; E. B. xvi. 1095; Baxter, vi. 424.

4. Gibbous Duckmeat—(*Lemna gibba.*)

Similar situations, but rare. Chorlton. Seaman's Moss Pits, sparingly, and abundant in pits at the edge of the canal alongside. These pits are interesting as containing all four of the British Lemnas. Fl. as *L. polyrhiza.*

Curtis, iv. 583; E. B. xviii. 1233.

All the Lemnas, except *polyrhiza*, make excellent aquarium plants, keeping the water clean, and tempering the light of the sun.

CXLIII.—THE SWEET-FLAG FAMILY. *Orontiáceæ.*

The Orontiaceæ, like the Arum family, are remarkable in having their flowers borne upon a "spadix." In general appearance also they are very similar to the Araceæ, but their flowers are bisexual, without any tendency to become unisexual, and in the principal portion there

is developed a small but regular perianth. The species, which are not numerous, belong both to warm countries and to cold ones, the typical species, or common sweet-flag, inhabiting Britain, and occurring near Manchester. This curious and very interesting plant is a reed-like aquatic, having a long, stout rhizome or root-stock, which creeps horizontally in the mud, and sends up abundance of bright-green grassy leaves, usually two to three feet high, and about half an inch broad. The flower-stem is simple and erect, nearly as tall as the leaves, and flattened at the sides. About half way up the handsome and remarkable spadix is thrown out,—a body the size of the fore-finger, cylindrical, tapering, of a light greenish-brown colour, slanting upwards, and formed of innumerable hexandrous flowers, each with a free and sessile ovary. The portion of stem above the spadix is in reality the spathe, but so much lengthened and so much flattened as to have lost its normal character. Every part of the plant is delightfully aromatic when crushed or bruised, on which account the dried rhizomes are kept in quantities in the druggists' shops.

HABITATS AND LOCALITIES.

COMMON SWEET-FLAG—(*Acorus Calamus.*)

Borders of ponds, growing in the water, common, but often without flowers for many years together. In the ponds at the further side of Hale Moss it blossoms abundantly every season. Plentiful at Eccles. (J. S.) Plentiful at High Legh. Fl. June, July.

E. B. v. 356; Baxter, v. 330.

The gem of this family is that lovely flower the *Calla Æthiopica*, commonly known in parlours and green-houses, of which it is a deservedly frequent ornament in spring and early summer, under the name of the African or Ethiopian lily. The stem, which is generally about two feet high, bears on its summit a superb vase-like spathe of the purest white, and as large as a wine-glass, but elegantly recurved from the base upwards, so as to disclose the point of the golden spadix in the centre, the *ensemble* of the flower reminding us of an alabaster lamp. The spadix is covered for its whole length with minute blossoms, and often powdered over with their white pollen, so that it is quite a different thing from the spadix of the Arum, with which it is not infrequently confounded. There are usually five or six handsome leaves from the base of the stem, and on stalks of about the same length. The *Calla palustris*, which will grow out of doors, is seen occasionally, along with a singular plant called *Pothos fœtidus*.

SECTION 2.—GLUMACEOUS.

CXLIV.—THE GRASS FAMILY. *Graminàceæ.*

In its popular application, and especially with farmers, the word "grass" is synonymous with *herbage*. Botanists restrict it to a particular family of Endogens, represented in the chief components of hay, and in the invaluable plants which yield corn, as wheat, rice, barley, oats, rye, millet, and maize, also in the bamboo and the sugar-cane, all of which latter are in structure precisely similar to the ordinary grasses that cows eat, but with their stems or seeds developed to a great size. The corn-bearing species are generally called the *Cerealia*, in allusion to the mythological goddess Ceres, whose assigned province was the guardianship of the harvest.

The grasses have cylindrical and jointed stems, in the smaller kinds termed *straws*, and which are usually hollow and erect. They are closed up solidly at the joints, and those of the cerealia in particular

Fig. 200.
Flower of Grass (magnified).

are often hardened on the outside by a deposit of flinty matter from the sap. The leaves are as simple as can be conceived, consisting only of fine thread-like veins running side by side from the base of the leaf to the apex, with the usual cellular tissue and cuticle, and are in every case very thin, long, narrow, and pointed. Sometimes they are exceedingly flaccid, sometimes wire-like, sometimes so dry and keen-edged as to cut like the blade of a knife. They consist at the lower part, of a long tubular sheath, corresponding to petiole, which is split lengthways, and surrounds the straw, the upper half forming a kind of lamina to it. At the point where the lamina springs from the stem, on the inside, there is a small and delicate membranous appendage called the "ligule." The flowers consist simply of small and usually very minute green bracts, placed alternately upon the axis that supports them, one above the other, instead of in whorls or rings, as in Exogens, and in the liliaceous families of Endogens. (Fig. 200.) The stamens are

almost invariably three, sometimes six, two, or one; the ovary is solitary, with a single ovule; the stigmas are generally two, large, and beautifully feathered. The fruit resembles a little seed, as familiarly exemplified in grains of wheat or barley. The inflorescence is generally either in panicles or spikes. (Figs. 201, 202, 203.) In stature and ornamental character they differ immensely, and the same may be said of their habitats. Many grow in water, and not a few close to the sea, where washed by the spray. The number of species is probably not much short of four thousand, but the number of individuals immeasurably greater than of any other family, in northern latitudes forming that cheerful evergreen carpet which the eye and body alike repose on with such content. In value the Graminaceæ are second only to the palm-

Fig. 201.
Sweet-scented Vernal-grass.

Fig. 202.
Spike.

Fig. 203.
Panicle—Quaking Grass.

trees, supplying not alone pasturage for the herbivorous animals, bread in the cerealia, and sugar, but a variety of materials that can be turned to useful account, and serving also various physical uses to the soil. In the tropics they often attain such vast altitudes as to flaunt their silken panicles above the trees that stand around them.

Opinions are divided as to the number of grasses wild in England. Authors who recognize the whole or most of the proposed species, make the number about one hundred and twenty-five. Those who do not see the asserted distinctions regard them as ninety-nine or one hundred. Near Manchester we have under the liberal view sixty, under the condensed one fifty-four; the latter is the number acknow-

ledged in the present volume, and even this is probably too high. Before proceeding to the analysis of them, the student must observe that the entirely new and distinct structure of these plants requires the use of a few new terms to correspond.

The floral coverings which occupy the place of the calyx and corolla in other plants, are in the grasses called chaff-scales, or "glumes," "glumelles," and "paleæ."

Each little cluster of blossoms is termed a "spikelet." A spikelet however, may contain but a single blossom.

The slender, bristle-like extremities often found upon a portion of the chaff-scales are called the "awns." In some cases these "awns" are an inch or more in length, and are of great service as guides, but they cannot always be absolutely relied upon, certain species being found both with awns and without them.

It is further important to observe that the appearance of grasses varies greatly with the stage of their bloom. A beginner could in some cases hardly suppose it possible that the young and the mature states could look so different, as in the meadow soft-grass for example. They are strongly affected also by the place of growth, and by moisture and dryness of soil. In the following analysis, the same grass is often inserted in several sections, so as to provide against the difficulties mentioned, as far as practicable.

PRELIMINARY ANALYSIS.

A.—Spikelets collected into erect, solid, solitary, oval, or cylindrical heads, p. 424.
B.—Spikelets disposed in open, unbranched racemes.
* Spikelets with long awns, p. 424.
** Awns absent or very minute, p. 425.
C.—Spikelets disposed in panicles, which are more or less compound, branching, and open.
* Panicles of not more than three or four branches; spikelets not exceeding a dozen in all, p. 425.
** Panicle of many divisions or branches, more or less open; the spikelets usually very numerous.
† Spikelets with conspicuous tufts of hair in the interior, p. 426.
†† Spikelets without such tufts of hair, p. 426.
‖ Spikelets large, awned, drooping from the ends of hair-like branchlets that are several inches long, p. 426.
‖ ‖ Branches of the panicle erect and spreading, never pendulous.
Div. 1st.—Scales of a beautiful shining silvery gray, silvery green, or silvery yellow, p. 426.
Div. 2nd.—Scales without remarkable gloss.
Sect. 1st.—Branches of the panicle erect, or nearly so, p. 427.
Sect. 2nd.—Branches spreading, horizontal, or pointing downwards, p. 428.

PARTICULAR ANALYSIS.

A.

Spikelets collected into erect, solid, solitary, oval, or cylindrical heads.

*

Head short and thick, shaped like a filbert, but longer. Flowers pale, prettily variegated with green stripes. Stems two to three feet high ..... 4. CANARY GRASS.

**

Head long and slender, in size and shape resembling the barrel of a goose-quill.

Spikelets without awns; heads two to four inches long, obtuse; plant glaucous; stems one to three feet high ..... 6. MEADOW CAT'S-TAIL.

Spikelets with awns.

Stems wholly upright.

Head obtuse, hoary; loaded, when in perfection, with purple or buff-coloured anthers..... 7. MEADOW FOX-TAIL.

Head pointed, slender, purplish..... 8. CORNFIELD FOX-TAIL.

Lower portion of the stem long and trailing, and remarkably bent at the joints.

Anthers purple, linear ..... 9. COMMON MARSH-FOX-TAIL.

Anthers yellow, short and thick ..... 10. TAWNY MARSH-FOX-TAIL.

B.

Spikelets disposed in more or less open, unbranched racemes.

* Spikelets with long awns.

Racemes half-pendulous; spikelets an inch long, cylindrical, pointed at each end, distant; stems two to four feet high, very hairy..... 31. COMMON FALSE BROME.

Racemes erect.

Raceme cylindrical, the spikelets pointing in all directions.

Stem two feet high; raceme three inches long.... 26. WOOD BARLEY-GRASS.

Stem six to twelve inches high; raceme an inch to an inch and a half long ..... 2. GREEN BRISTLE-GRASS.

Raceme flat-sided or square; stems two to three feet high.

Spikelets placed broadside against the stalk.

Rootstock creeping. Plant generally glaucous.. 27. COUCH-GRASS.

No creeping rootstock; stems tufted; plant not glaucous ..... 28. DOGS' WHEAT-GRASS.

Spikelets placed edgeways against the stalk.

Outer glume as long or longer than the spikelet. 30. COMMON DARNEL.

Outer glume shorter than the spikelet. Awns very long and slender ..... 29. ITALIAN RAY-GRASS.

** Awns absent or, if any, inconspicuous.

1. Raceme cylindrical, the spikelets projecting on every side, sometimes a little branched at the base.

Stems twelve to fifteen inches high; flowers brownish-yellow, glossy; stamens two, very conspicuous } 3. SWEET-SCENTED VERNAL-GRASS.

Stems two to five inches high, densely tufted; raceme dense, and contracted, scarcely an inch long, and shining ..... 18. VERNAL HAIR-GRASS.

2. Raceme flat-sided or square, the spikelets being placed on opposite sides of the stalk. Stems two to three feet high.

Spikelets cylindrical, linear-oblong, placed obliquely to the wavy stalk ..... 38. RAY FESCUE.

Spikelets flat and very short.

Spikelets placed edgeways.

Outer glume as long or longer than the spikelet. 30. WHITE DARNEL.

Outer glume shorter than the spikelet ..... 29. COMMON RAY-GRASS.

Spikelets placed broadside to the stalk; plant glaucous; rootstock creeping ..... 27. COUCH-GRASS.

3. Raceme unilateral, the spikelets being all on one side of the stalk, and pointing in one direction, or nearly so.

Herbage bristle-like, in coarse, short, rigid tufts, three to six inches high. Flowers inconspicuous. Anthers white ..... 25. WIRE-GRASS.

Herbage scanty, green, flat, and succulent; stems twelve to eighteen inches high; flowers handsome; spikelets resembling little combs. Raceme close and compact, nearly flat down the back, full and convex in front. Anthers purple..... 41. CRESTED DOG'S-TAIL.

C.

Spikelets disposed in panicles, which are more or less compound, branching, and open.

* Panicles of not more than three or four branches; spikelets not exceeding a dozen in all, and without awns.

Stems six to eight inches high, stiff, harsh, procumbent below, but at the upper part erect. Panicle an inch to an inch and a half long; spikelets green, generally about six ..... 53. TRIODIA.

Stems fifteen to twenty inches high, very numerous, leafy, slender, delicate, and inclined to droop at the upper part; the branches and spikelets all bending one way. Panicle three to five inches long; spikelets ten to fifteen, egg-shaped, reddish brown..... 52. WOOD MELIC.

** Panicle of many divisions or branches, more or less open; the spikelets usually very numerous.

† Spikelets with conspicuous tufts of hair in the interior.

Hairs silvery; spikelets much crowded.
Stems six to ten feet high; panicle very large, deep reddish-brown; leaves fifteen inches long, stiff, finely attenuated. (Often growing in water).. 54. Common Reed.
Stem two to three feet high; spikelets small, delicate light brown or whitish; leaves flaccid. (Never grows in water) ..... 15. Small Wood Reed.
Hairs brown; stems two to three feet high; spikelets green, far apart, drooping; awn long, twisted, and bent ..... 20. Wild Oat.

†† Spikelets without conspicuous interior tufts of hairs.

‖ Spikelets large, awned, at the extremities of long, slender, hair-like branchlets, and drooping archwise, all to one side.

Awns shorter than the glumes; stems four to six feet high; lower leaves broad and hairy ..... } 33. Rough Drooping Brome-grass.
Awns much longer than the glumes.
Spikelets long, linear-lanceolate; stems two feet high. 34. Hedge Drooping Brome-grass.
Spikelets compressed; stems three to five feet high; leaves with brown auricles at the base of the lamina ..... } 36. Giant Drooping Brome-grass.

‖ Branches of the panicle erect and spreading; sometimes slightly projecting stiffly downwards, but never pendulous archwise.

Division 1st.

Glumes of a beautiful shining silvery gray, silvery green, or silvery yellow, often semi-transparent, the spikelets always *two or more flowered*.

Growing in water, upon which the leaves float. Panicle long, slender, slightly branched, silvery green; spikelets appressed. Anthers white..... } 45. Floating Sweet-grass.
Growing on *dry* land.
Spikelets without awns, or only very minute ones.
Leaves in large, dense, cushion-like tufts, flat, hard, and very rough. Stems two to four feet high; branches rough. Panicle very large, silvery gray, or purplish ..... 16. Tufted Hair-grass.
Leaves few and smooth; stems twelve to eighteen inches high; spikelets triangular; variegated with purple and green; panicle tremulous. (Fig. 203) ..... 43. Quaking-grass.

Spikelets conspicuously awned.

a. Panicle dense, egg-shaped or roundish; awns very long and bristly..... 42. HEDGEHOG-GRASS.

b. Panicle contracted, elongated, silvery gray, four to eight inches long, inclining to one side. Stems three feet high ..... } 22. SILVER OAT-GRASS (while young).

c. Panicle open and spreading.

Leaves hair-like; panicle one to three inches long, silver-gray.

Stem six inches high; root annual; leaves few and short; panicle triply branched. 19. SILVERY HAIR-GRASS.

Stems twelve to eighteen inches high; densely tufted; root perennial; leaves very numerous, long, and densely tufted; branches of the panicle crisped and wavy ..... 17. HEATH HAIR-GRASS.

Leaves flat; panicle three to eight inches long.

Panicle yellowish, especially after flowering; stamens long; stem and leaves hairy.. 21. YELLOW OAT-GRASS.

Panicle silver-gray, unilateral; lowermost flowers with stamens only; stems three feet high..... 22. SILVER OAT-GRASS.

DIVISION 2ND.

Spikelets either without remarkable gloss, and in that case many-flowered; or if shining, then only *one-flowered.*

Section 1st.

Branches of the panicle pointing upwards, or diverging only at a very slight angle, rendering it close, narrow, and in form like a Lombardy poplar. Panicle sometimes a little drooping.

1. Growing in or near water. Stems reed-like, three to five feet high; leaves densely tufted, long, upright, never floating. Panicle two to eight inches long, often with a reddish tinge, perfectly upright ..... } 5. RIBBON-GRASS (while young).

2. Growing on moors or peat-bogs. Stems one to two feet high, with only one visible knot, and that near the base. Panicle two to eight inches long; reddish-purple, sometimes greenish; perfectly upright; anthers and stigmas reddish-purple .. 51. PURPLE MOOR-GRASS.

3. Not growing habitually on moors, or in water; generally in cultivated land, or by dry waysides.

a. Flowers brownish-yellow; outer glumes very pointed; plant perfectly glabrous; stamens two, large, and hanging out loosely. Stem six to fifteen inches high. Panicle perfectly upright. Spikelets one-flowered. (Fig. 201) } 3. SWEET-SCENTED VERNAL-GRASS.

b. Flowers usually of a fine pinky-red, especially at the tips; whole plant downy and soft with fine white hairs. Stem six to fifteen inches high. Panicle upright or a little inclining ..... 23. Meadow Soft-grass (while young).

c. Flowers grayish-green; panicle upright or a little drooping. Stems eighteen inches to three feet high.

Ovary glabrous; style terminal ..... 38. Tall Fescue-grass.

Ovary hairy; style lateral.

Glumes narrow-lanceolate; outer ones obscurely ribbed; anthers orange-coloured ..... 32. Upright Brome-grass.

Glumes oblong, turgid; outer ones distinctly ribbed. Plant and spikelets more or less downy ..... 35. Common Brome-grass.

d. Plant very slim and slender, six to eight inches high. Leaves hair-like. Flowers monandrous. Panicle unilateral; awns long..... 39. Roadside Fescue.

Section 2nd.

Branches of the panicle more or less spreading, the lowermost usually horizontal, and often pointing a little downwards.

1. Panicle irregular, the branches often directed all one way. Spikelets many-flowered.

Awns long and conspicuous. Plant resembling oats, two to three feet high, with a large green panicle. Spikelets pendulous..... 20. Strigose Oat.

Awns absent, or, if any, very short and inconspicuous.

Plant rough and coarse, two to three feet high. Panicle two to three inches long, with one or two long horizontal branches at the base; the upper branches erect. Spikelets densely ovate ..... 40. Rough Cock's-foot.

Plant smooth and slender.

Scales generally acute. Plant dry, usually wiry, and rather glaucous.

Radical leaves cylindrical, hair-like, and densely tufted. Stems four to ten inches high ..... 37. Sheep's Fescue.

All the leaves flat. Stems twelve to eighteen inches high ..... 38. Meadow Fescue.

Scales obtuse. Plant light green and juicy.

Annual, three to ten inches high, growing everywhere as a weed ..... 46. Annual Garden-grass.

Perennial, one to three feet high. A rare plant in woods ..... 49. Sylvan Meadow-grass.

2. Panicle beautifully symmetrical and pyramidal, the branches spreading regularly in all directions, two or three often proceeding from one point, and gradually decreasing in length upwards.

Growing in water.

Plant bushy, stems 3—6 feet high, stout and strong.

Panicle whitish or inclining to pink, taper, and not more than two inches in diameter at the base ..... 5. RIBBON-GRASS.

Panicle fine brown, very large, obtuse, five or six inches in diameter at the base ..... 44. WATER BROWN-REED.

Plant weak and flaccid, six to twenty inches high. Leaves broad and short, with an abrupt point, like a Roman sword. Glumes brownish, remarkably ragged at the extremity .. 50. WATER BITTEN-GRASS.

Growing on land, in meadows, woods, and by waysides.

Plant more or less downy with fine hairs, which give it a pale appearance.

Outer scales pointed, the awn projecting beyond them; joints surrounded by tufts of white hairs; root creeping..... 24. SYLVAN SOFT-GRASS.

Outer scales obtuse, the awn concealed by them; very little down on the joints, but the stem very soft and velvety; root not creeping.. 23. MEADOW SOFT-GRASS.

Plant glabrous.

Spikelets many-flowered; no awns. Stems twelve to eighteen inches high.

Plant with creeping scions. Ligule short and blunt ..... } 47. SMOOTH MEADOW-GRASS.

Plant without creeping scions. Ligule long and pointed ..... } 48. ROUGH MEADOW-GRASS.

Spikelets one-flowered; sometimes awned.

Panicle green, branches distant, often bent downwards; stem two to five feet high. Growing in woods..... 1. WOOD MILLET-GRASS.

Panicle brown or whitish. Spikelets numerous.

Awns two to four times as long as the shining spikelets ..... 14. SILKY BENT-GRASS.

Awns none, or if present, not twice as long as the spikelets.

Flowering glume awnless, or with a very short awn at its base.

Panicle brown ..... 11. COMMON BENT-GRASS.

Panicle whitish ..... 12. WHITE BENT-GRASS.

Flowering glume with a short awn below the middle. Palea minute or wanting. Panicle rather close .. 13. SMALL BENT-GRASS.

HABITATS AND LOCALITIES.

1. Wood Millet-grass—(*Milium effúsum.*)

Woods and shady cloughs, rather rare. Abundant in the woods at Styal, Cotterill, and about Reddish. Banks of the Irwell, near the East Lancashire Viaduct, Clifton. Fl. May.

Curtis, ii. 229; E. B. xvi. 1106; Baxter, iv. 247.

An exceedingly elegant grass, flowering along with the rose lychnis and the yellow dead-nettle, and still beautiful when the wild raspberries ripen in August.

2. Green Bristle-grass—(*Setária viridis.*)

Twenty or thirty plants of this grass, which is no more than a way-side weed, made their appearance in Monton fields in 1848. (J. S.) Since then it does not appear to have been observed. Fl. Summer and autumn. Annual.

Curtis, ii. 222; E. B. xiii. 875 (both as *Pánicum víride.*)

3. Sweet-scented Vernal-grass—(*Anthoxánthum odorátum.*)

Everywhere in meadows and pastures, and on hedgebanks, growing in every kind of soil, from the poorest and driest to the most fertile. Fl. April—July, full-blown in the middle of May.

Curtis, i. 4; E. B. ix. 647; Baxter, ii. 99.

The earliest of the hay-grasses to show its spikes of bloom, and reputed the chief source of the perfume of the newly-mown meadows.

4. Canary-grass—(*Phálaris Canariénsis.*)

Occasionally in cultivated land and on manure heaps, being common in gardens as an ornamental plant, and the seeds escaping with the refuse. Fl. Summer. Annual.

E. B. xix. 1310; Baxter, i. 56.

The spikes of this grass are singularly beautiful, by reason of the broad green stripes upon the glumes. In gardens they are often as long as one's little finger. The small polished yellow fruits are the "canary-seed" given to cage-birds.

5. Ribbon-grass—(*Digraphis arundinácea.*)

In ditches and by pond and river sides, common everywhere. Fl. June, July.

E. B. vi. 402 (as *Phálaris arundinácea.*)

The striped-leaved plant everywhere cultivated in gardens under the name of "French-grass" is a variety of this.

6. Meadow Cat's-tail—(*Phléum praténse.*)

Everywhere on the borders of fields, but seldom among the hay, not flowering till the hay-making is pretty well over, and most luxuriantly in autumn.

E. B. xv. 1076; Baxter, i. 68.

Called "Rat's-tail" about Lymm.

7. Meadow Fox-tail—(*Alopecúrus praténsis.*)

Meadows and pastures, everywhere, one of the earliest and most conspicuous grasses of the hay-field. Fl. May, June.

Curtis ii. 297; E. B. xi. 759; Baxter, i. 45.

8. Cornfield Fox-tail—(*Alopecúrus agréstis.*)

As a weed among corn, Italian rye-grass, and other farm-crops, occasionally. Fl. June, July. Annual.

Curtis, i. 79 (as *Alopecurus myosuroides*); E. B. xii. 848.

9. Common Marsh Fox-tail—(*Alopecúrus geniculátus.*)

Everywhere by the sides of ponds, and in low, wet, marshy places, rising only a few inches above the surface of the ground. Fl. June, July.

Curtis, ii. 298; E. B. xviii. 1250.

10. Tawny Marsh Fox-tail—(*Alopecúrus fulvus.*)

In similar situations, but not so common. Plentiful on the borders of Mere Mere. Fl. June, July.

E. B. xxi. 1467.

Probably only a variety of the preceding.

11. Common Bent-grass—(*Agrostis vulgaris.*)

Everywhere in meadows and pastures, and on dry banks, a beautiful ornament in particular to the borders of corn-fields at harvest time. Fl. June—August.

E. B. xxiv. 1671.

12. White Bent-grass—(*Agrostis alba.*)

In similar situations, but where the ground is somewhat moist. Often very fine in the trenches cut for draining fields. Fl. Summer.

E. B. xvii. 1189; Baxter, vi. 492.

A variety with long, prostrate, and creeping stems, formerly called *Agrostis stolonifera*, (E. B. xxii. 1532.) grows in swampy places in Mere Clough, &c.

Another variety, three feet high, is common in corn-fields. All three states of the plant are probably identical with the *Agrostis vulgaris*.

13. Small Bent-grass—(*Agrostis canina.*)

Moist heaths and moors, and on the borders of ponds and ditches, common. Dunham Park. Plentiful on Hale Moss and by Rostherne Mere. Fl. June, July.

E. B. xxv. 1856.

Probably not distinct as a species from the *Agrostis vulgaris*.

14. Silky Bent-grass—(*Agrostis Spica-venti.*)

Occasionally among farm-crops. Eccles. (J. S.) Fl. July. Annual.

E. B. xiv. 951.

15. Small Wood Reed—(*Calamagróstis lanceoláta.*)

Moist woods and cloughs, rare. Abundant in Mere Clough, on the slope opposite the white cottage in the middle. Plentiful on the margin of Rostherne Mere. Fl. July, August.

E. B. xxx. 2159 (as *Arundo Calamagrostis*).

16. Tufted Hair-grass—(*Aira cæspitósa.*)

Damp, waste ground; in low, wet meadows; by pondsides, and in the recesses of moist woods, abundant everywhere. Fl. July, August.

E. B. xxi. 1453.

A large, tall grass of remarkable beauty, but hurtful rather than useful to the farmer.

17. Heath Hair-grass—(*Aira flexuósa.*)

Heaths, moors, on the borders of the mosses, and in dry woods, abundant everywhere. Carrington Moss, very plentiful and luxuriant. Fl. June, July.

E. B. xxii. 1519.

18. Vernal Hair-grass—(*Aira præcox.*)

Dry waysides and borders of sandy fields, not infrequent. Hale Moss. Edges of Lindow Common. Abundant in Long Lane, Bowdon. Monton Green, plentiful every year. (J. S.) Chorlton. Withington. Baguley. Hough End. Fl. May, June. Annual.

Curtis, i. 152; E. B. xviii. 1296.

A pretty little grass, only two or three inches high, and growing in dense silvery patches.

19. Silvery Hair-grass—(*Aira caryophylléa.*)

In similar situations, but rarer. Long Lane, Bowdon. Lindow Common. Dunham Park. Carrington. Near Clifton Aqueduct. Plentiful about Eccles and in the road to Worsley. (J. S.) Fl. May, June. Annual.

Curtis, ii. 370; E. B. xii. 812; Baxter, vi. 416.

20. Wild Oat—(*Avena fátua.*)

Occasionally in corn-fields, especially among barley and oats, as a weed. Fl. with the corn. Annual.

E. B. xxxi. 2221.

Cultivated in curious gardens for the sake of the seeds, which are hygrometric, and furnish great amusement as a parlour toy.

A variety of this plant, called *Avena strigosa*, (E. B. xviii. 1266.) occurs in similar situations, and particularly on the slopes of railway cuttings. It differs from the ordinary state chiefly in its closer panicle, more divided branches, and in having two short awns besides the long and conspicuous one. The cultivated oat, or *Avena sativa*, is another variety, readily degenerating into the wild state. It is distinguished by having one or more of the upper spikelets imperfect and awnless, and by the absence of the interior tuft of fulvous hairs.

21. Yellowish Oat-grass—(*Trisetum flavéscens.*)

Dry meadows, rather rare. Below Bowdon old church. Near Hyde. Between Agecroft and Clifton. About Chorlton, Stretford, and Whalley Range. Fl. June, July.

Curtis, i. 150; E. B. xiv. 952 (both as *Avena flavescens*).

22. Silver Oat-grass—(*Arrhenathérum avenáceum.*)

Everywhere among mowing-grass and upon hedgebanks. Fl. June.

Curtis, i. 151 (as *Avena elatior*); E. B. xii. 813 (as *Holcus avenáceus*); Baxter, vi. 480.

23. Meadow Soft-grass—(*Holcus lanátus.*)

Everywhere in meadows and pastures, but rarely, if ever, in woods or cloughs, or where shaded by trees. Fl. all summer.

Curtis, ii. 228; E. B. xvii. 1169; Baxter, i. 64.

Remarkable for the fine red colour of its flowers while unexpanded, and for the velvety softness of every part.

24. Sylvan Soft-grass—(*Holcus mollis.*)

Woods and shady places, common everywhere, but never in open fields or among mowing-grass. Fl. July, August.

Curtis, ii. 300; E. B. xvii. 1170.

Remarkable for its woolly joints, and the general whiteness of the little panicles, which are the only ones of the kind found under trees.

The habitats of the two species are exactly the reverse of each other.

25. Wire-grass—(*Nardus stricta.*)

Moors and heaths, everywhere; and in dry moory fields, occasionally. Abundant on all the high hills. Dunham Park. Fl. June.

Curtis, iv. 584; E. B. v. 290; Baxter, iv. 300.

26. Wood Barley-grass—(*Hordeum sylváticum.*)

Cotterill Clough; the only station known for it hereabouts. Fl. July.

E. B. xix. 1317; Baxter, vi. 496 (both as *Elymus Europæus*).

27. Couch Grass—(*Agropyron répens.*)

Cultivated farm-land, and in hedges, everywhere,—a pestilent weed. The awned variety plentiful about Ashley, &c. Fl. July—September.

E. B. xiii. 909; Baxter, iii. 112 (both as *Triticum repens*).

28. Dogs' Wheat-grass—(*Agropyron caninum.*)

Shady places, and on the banks of rivers, where there are trees. Plentiful between Bowdon and Cotterill, and on the banks of the Irwell, from Agecroft upwards. Hough End Clough. Fl. July, August.

E. B. xx. 1372 (as *Triticum caninum*).

29. Common Ray-grass—(*Lólium perénne.*)

Everywhere in meadows and pastures, on hedgebanks, and dry waysides. Fl. all summer.

Curtis, iii. 449; E. B. v. 315; Baxter, ii. 116.

A very variable grass, the racemes of all degrees of tenuity and contraction, and sometimes even branched.

The remarkably handsome plant called "Italian ray-grass" (*"Lólium multiflórum*), originally imported from the Continent, and much sown on farm-land, whence it has escaped into a seemingly wild condition, is a variety of the *L. perenne*, induced by cultivation abroad. It is distinguished by its great size, and very long awns.

30. Darnel—(*Lólium temulèntum.*)

Cornfields, as a weed, but rather local. Between Apethorne and Gee Cross. (Mr. Sidebotham.) Chorlton. Prestwich. Bowdon. So exceeding abundant at Mobberley, among wheat, every year, that in a single walk through the fields, a large sheaf may be collected. This

is the *awnless* state of the plant, called, by some botanists, white darnel, or *Lolium arvense*. The country people thereabouts believe it to be degenerated wheat. (Mr. Holland.) Fl. July. Annual.

E. B. xvi. 1124 (*Lolium arvense*, E. B. xvi. 1125).

31. Common False-brome—(*Brachypódium sylváticum.*)

On moist shady hedgebanks, and in woods, common everywhere. Abundant about Cheadle. Fl. August, September.

E. B. xi. 729 (as *Bromus sylvaticus*).

32. Upright Brome-grass—(*Bromus eréctus.*)

In a meadow between Werneth Lowe and Compstall Bridge, plentiful. (Mr. Sidebotham.) Fl. June.

E. B. vii. 471.

33. Rough Drooping Brome-grass—(*Bromus asper.*)

Moist woods and cloughs, common. Fl. summer and autumn. Annual or biennial.

Curtis, i. 80 (as *Bromus hirsutus*); E. B. xvii. 1172.

34. Hedge Drooping Brome grass—(*Bromus stérilis.*)

Dry hedgebanks and by waysides, common. Plentiful about Lymm and Bowdon. Fl. summer and autumn. Annual or biennial.

Curtis, i. 9; E. B. xv. 1030.

Called "sterilis," not because unproductive of seeds, but by reason of its uselessness to cattle.

35. Common Brome-grass—(*Bromus mollis.*)

Everywhere in meadows and pastures, and by waysides. Fl. the whole season, but especially in spring and early summer. Annual and biennial.

Curtis, i. 8; E. B. xv. 1078; Baxter, v. 348.

The Proteus of English grasses, and well named by Scopoli *polymórphus*. Several supposed species have been made out of it, three of the principal forms, besides the normal one, occurring in our own neighbourhood.

1. The common condition of the plant, or genuine *Bromus mollis* of authors, has a nearly erect panicle, which is either short and compact, or long and slender, and is in every part softly downy. This occurs everywhere.

2. The next commonest form is distinguished by its rather glossy, gray-green spikelets, acquiring a brownish tinge in sunny spots; and by its having longer and harsher peduncles than those of the ordinary *mollis*, while the panicle, instead of a strong tendency to the erect position, is rather disposed to droop. Authors

call it *Bromus commutatus*. It appears to be the plant figured in E. B. xiii. 920 as *B. pratensis*.

3. Next there is the form figured in E. B. xv. 1054, as *Bromus racemósus*. This resembles the common *mollis*, except that it is nearly glabrous. On the borders of fields, and generally in farm-land, it is not very uncommon.

Fourthly, there is a tall, corn-field variety, growing two to three feet high, with a loose, more or less drooping and hairy panicle, easily distinguished when in fruit, by the separately rolled-up flowers. This is the *Bromus secalínus*, figured in E. B. xvii. 1171. It has been gathered at Hough End, and is common among oats, at Mobberley, where the country people call it drook, and believe it to be oats degenerated. (Mr. Holland.)

36. Giant Drooping Brome-grass—(*Bromus gigánteus.*)

Woods, groves, thickets, and shady hedge-banks, common everywhere. Fl. August, September.

Curtis, ii. 299; E. B. xxvi. 1820 (as *Festuca gigantea*).

Easily distinguished among the late-flowering grasses by its immense and most elegantly drooping and slender panicle, towering above the ferns four to six feet above the ground. The only grass resembling it is the *Bromus asper*, from which it is known by the smoothness of the sheaths of the leaves, those of the *asper* being hairy, and infallibly by the two brown auricles at the base of the lamina.

37. Sheep's Fescue-grass—(*Festuca ovina.*)

Heaths, moors, and hilly pastures, generally where dry and open, common. Fl. June, July.

E. B. ix. 585.

When it grows in low, moist meadows, as very frequently happens, this plant is larger and more luxuriant, and the slender, hair-like, densely-tufted leaves of the hill-side are exchanged for nearly flat ones, at least upon the stem. Under this aspect it is often distinguished as a species; and called the hard fescue, or *Festuca duriuscula* (E. B. vii. 470).

In gardens there is sometimes cultivated a large and very elegant and curious variety of the *Festuca ovina*, in which instead of panicles of flowers, there are dense clusters of young plants, the weight of which bows the stem archways down to the ground, where they take root, and form a miniature banyan-tree. This plant was formerly esteemed a species, and called *Festuca vivipara*.

38. Meadow Fescue—(*Festuca praténsis.*)

Moist meadows and pastures, common everywhere. Fl. June, July.

Curtis, ii. 371; E. B. xxiii. 1592; Baxter, v. 324.

Like the *Bromus mollis*, an exceedingly variable grass. In the normal condition the panicle is nearly erect, and branched, but rather close; this is the form commonly found in hay-fields. When growing on the banks of rivers and in other wet places, it becomes taller and often reed-like, and has a larger and more

branched and spreading panicle, along with broader leaves. In this state it is the tall fescue, or "*Festuca elatior*," of Curtis, ii. 372; E. B. xxiii. 1593, a plant tolerably frequent near Manchester, but by no means so plentiful as the normal form. In similar situations, especially where the soil is rich, the spikelets are often almost sessile, so as to convert the panicle into a large and nearly simple spike. This variety has been raised to the rank of a species under the name of ray-fescue, or *Festuca loliacea*, (Curtis, ii. 373; E. B. xxvi. 1821.) but is now generally acknowledged to be only a form of the common *F. pratensis*, or rather, all three are modifications of a single type. It grows abundantly in Ashley meadows and about Northen.

39. Road-side Fescue—(*Festuca bromoides.*)

Dry waysides, as a weed, rather uncommon. Alderley Edge. Whalley Range. Dunham Park. Bowdon. Prestwich. Mobberley. (Mr. Holland.) Red Brows, near Didsbury. Eccles. (J. S.) Fl. June—August. Annual.

E. B. xx. 1411.

40. Rough Cock's-foot—(*Dáctylis glomeráta.*)

Everywhere in meadows and pastures and by waysides. Fl. summer and autumn.

E. B. v. 335; Baxter, ii. 108.

41. Crested Dog's-tail—(*Cynosúrus cristátus.*)

Everywhere in meadows and pastures where tolerably dry. Fl. June, rather late compared with the other hay-grasses.

E. B. v. 316; Baxter, iii. 216.

A grass of remarkably beautiful construction, the flowers all looking one way, and the spikelets resembling little combs.

42. Hedgehog-grass—(*Cynosúrus echinátus.*)

Abundant in 1847 in a field near the Dog-house Farm, Withington, the same where the *Crepis setosa* grew so plentifully, and the seeds no doubt imported from the continent along with those of the crop, probably from Italy. The plants were remarkably luxuriant,—much handsomer than the ordinary wild ones of the continent; and more shining in their flowers. Since then it has been observed at Prestwich, among farm-crops. Fl. July.

E. B. xix. 1333.

43. Quaking-grass—(*Briza média.*)

Meadows and pastures, rather rare, except in the valley of the Bollin, and adjacent districts, where it is plentiful. Ashley meadows.

Remarkably fine between Handforth and Styal, and about Norcliffe Hall, the lawn before which is principally composed of it. Marple Vale. Reddish Vale. Slope of Mere Clough reservoir. Fl. June.

E. B. v. 340; Baxter, ii. 104.

The most graceful and delicate of the British grasses, the spikelets, which are triangular, and resemble little rattlesnakes' tails, hung on such slender stalks that they quiver with the slightest touch or breath of air.

44. Great Brown-reed—(*Glycéria aquática.*)

Sides of ponds, ditches, and water in general, not very common. Abundant near Timperley Bridge. Mobberley. Gee Cross. Fl. July.

Curtis, ii. 304; E. B. xix. 1315 (as *Poa aquatica*).

A tall, reed-like, and very handsome aquatic grass.

45. Floating Sweet-grass—(*Glycéria flúitans.*)

Everywhere in ditches and slow streams, and on the margins of ponds. Fl. summer.

Curtis, i. 7; E. B. xxii. 1520 (as *Poa fluitans*).

A very beautiful grass, easily identified by its leaves floating flat upon the surface of the water, and by the tall, very slim, green, and silvery panicles, which are often irregularly branched, and dressed with white anthers.

46. Annual Garden-grass—(*Poa ánnua.*)

Everywhere as a weed, with chickweed and groundsel, and like them again, in blossom always. Annual.

Curtis, i. 6; E. B. xvi. 1141; Baxter, iv. 288.

47. Smooth Meadow-grass—(*Poa praténsis.*)

Everywhere in meadows and pastures and on hedge-banks, preferring dry ground. Fl. spring and summer, commencing early.

Curtis, i. 77; E. B. xv. 1073.

48. Roughish Meadow-grass—(*Poa trivialis.*)

In similar situations, but giving the preference to *moist* ground, equally general, and flowering at the same seasons.

Curtis, i. 78; E. B. xv. 1072.

49. Sylvan Meadow-grass—(*Poa nemorális.*)

Woods, cloughs, and shady places, rare. Gatley Carrs. (Mr. Edward Stone.) Reddish and Arden Woods. Plentiful in a hedge on the way to Cotterill. (Mr. Leigh.) Pavement Lane, Mobberley. (Mr. Holland.) Fl. June.

E. B. xii. 1265.

50. Water Bitten-grass—(*Catabrósa aquática.*)

Ditches and pondsides, rather unusual. Very abundant on Hale Moss. Seaman's Moss Pits. Back Levenshulme. Plentiful near Chorlton church, and generally thereabouts. Fl. May, June.

Curtis, i. 5; E. B. xxii. 1557 (both as *Aira aquatica*); Baxter, iv. 252.

51. Purple Moor-grass—(*Molinia cærúlea.*)

Everywhere on heaths and moors. Abundant on the borders of Carrington Moss. Fl. June, July.

Curtis, ii. 303; E. B. xi. 750 (both as *Melica cærulea*).

52. Wood Melic—(*Melica uniflóra.*)

Damp shady woods and cloughs, common. Gatley Carrs. Lymm. Worsley Hen-pen. Reddish. Fl. May, June.

Curtis, ii. 302; E. B. xv. 1058.

A remarkably pretty grass, and very attractive about Whitsuntide, when the yellow dead-nettle and the rose lychnis are in bloom. The name "uniflora" means not that it is "one flowered," but that there is only one blossom to each spikelet, most grasses having several.

53. Triodia—(*Triódia decúmbens.*)

Hedgebanks, on dry moors, and in dry woods, common, often also in rough hilly pastures. Agecroft Park, on the bank by the carriage way, plentiful. Hale Moss. Plentiful between Hyde and Apethorne. Fl. July, August.

E. B. xi. 792 (as *Poa decúmbens*); Baxter, vi. 488.

54. Common Reed—(*Arúndo Phragmites.*)

Ditches and pondsides, common, often growing in dense forests, and obscuring the water; also in damp hedges and in cloughs and woods. Abundant on the borders of Rostherne Mere. Ashley. Reddish. Prestwich Dells. Fl. August, September.

E. B. vi. 401 (too pale); Baxter, v. 372.

The largest and stateliest of the English grasses, reed-like in its stems and leaves, often rising six to eight feet high, and in its immense panicles of purple and downy flowers, quite of tropical aspect. The latter make a splendid ornament for the hall or mantel-piece during winter.

Taken according to their general places of growth, the principal Manchester grasses may be arranged in the six following classes. Many often wander into unusual places, but these are their natural and established habitats:—

I.—Growing in meadows and pastures, and furnishing the staple of every hay-field. (Those marked * are rather local.)

3. Sweet-scented Vernal-grass.
7. Meadow Fox-tail.
21.*Yellowish Oat-grass.
22. Silver Oat-grass.
23. Common Soft-grass.
29. Common Ray-grass.
35. Common Meadow Brome-grass.
37. Hard Fescue.
38. Meadow Fescue.
40. Rough Cock's-foot.
41. Crested Dog's-tail.
43.*Quaking-grass.
47. Smooth Meadow-grass.
48. Rough Meadow-grass.

II.—Growing in woods, thickets, and hedges, never in the open fields.

1. Wood Millet-grass.
24. Sylvan Soft-grass.
27. Couch-grass.
28. Dogs' Wheat-grass.
31. Common False Brome.
33. Great Hairy Brome-grass.
34. Hedge Brome-grass.
36. Great Woodland Brome-grass.
52. Wood Melic.

III.—Growing in or near ditches, ponds, or other wet places, never in the open fields.

5. Ribbon-grass.
9. Common Marsh Fox-tail.
44. Great Brown-reed.
45. Floating Sweet-grass.
50. Water Bitten-grass.
54. Common Reed.

IV.—Weeds in cornfields and other cultivated land, by waysides, &c., never among hay.

20.*Wild Oat.
27. Couch-grass.
30.*Darnel.
46. Annual Garden-grass.

V.—Growing about the borders of fields, occasionally among the hay-grasses, frequently among corn, and in uncultivated farm-land.

6. Meadow Cat's-tail.
11. Common Bent-grass.
12. White Bent-grass.
16. Tufted Hair-grass.

VI.—Growing chiefly or exclusively on the moors.

17. Heath Hair-grass.
25. Wire-grass.
51. Purple Moor-grass.

In addition to the three aliens mentioned above (2, 4, and 42), the four following seem disposed to settle near Manchester. They occur on some refuse-heaps near a paper-mill at Bury :—

Digitaria sanguinalis,
Panicum capillare,
Setaria glauca,
Eleusine Indica.

The seeds have, no doubt, been brought from abroad with some materials used in the manufacture, and having found a place to their liking, have vegetated. (See Phytologist, N. S., No. 41.)

Very few Graminaceæ are grown as ornamental plants. The only common one, after the ribbon-grass (No. 5) and the others already named, is the greater quaking-grass, or *Briza maxima*. In curious gardens may occasionally be seen the *Lagurus ovatus*, (E. B. xix. 1334.) the *Hordeum jubatum*, and the feather-grass, or *Stipa pennata*, (E. B. xix. 1356.) resembling the long airy plumes of the Bird of Paradise; and good green-houses are generally provided with the fragrant-leaved lemon-grass, or *Andropogon Schœnanthus*, from the Cape of Good Hope, and often with the sugar-cane, and the bamboo, or *Bambusa arundinacea*. Maize or Indian corn, millet, and Egyptian or many-headed wheat, are sometimes raised for curiosity, the two first ripening tolerably when the autumn is fine and warm. The predominant cereals of the district are the beardless or winter wheat, oats, and the six-rowed barley. A little rye is sown here and there, and sometimes a little two-rowed barley.

CXLV.—THE SEDGE FAMILY. *Cyperáceæ.*

Superficially, the plants of this family bear a strong resemblance to grasses, with which alone it is possible to confound them. In many points of structure they also approach very closely. The roots are fibrous; the stems slender and straw-like, but instead of being round, hollow, and jointed, here they are usually triangular and solid, and rarely provided with joints and partitions. The leaves, like those of grasses, are long, narrow, and slender, but instead of soft and succulent, usually hard, rigid, and coarse, and often so exceedingly sharp at the edges as to cut the fingers if they be gathered incautiously. When provided with sheaths at the base, forming a tube round the stem, as in grasses, the tube is not slit down the side. The flowers, as in grasses, are borne in little brown or greenish "spikelets," the latter being either solitary and terminal, or disposed in panicles, spikes, or racemes, and occasionally in umbels. Every spikelet is placed in the axil of a leafy or scaly bract, consisting in itself of several smaller imbricated scales or bracts, in the axils of which are the minute and sessile flowers. The latter are destitute of perianth, except occasionally a few bristles or minute scales, and consist of three, or rarely two, stamens, and a solitary pistil, the ovary one-celled, the style more or less deeply divided into two or three flattened or linear branches, which are not feathery as in grasses. The fruit is small and seed-like, flattened when the styles or its branches are two; triangular when they are three. In some genera the flowers are unisexual, and in one large and important company, constituting the genus *Carex*, they are

often very distinctly apart, the male flowers collected in a large, terminal and erect catkin, the abundant yellow anthers of which render it strikingly handsome, while the females are in several other catkins, on the upper and middle part of the plant, and often remarkable for their length, beautiful cylindrical form, pretty green or brownish hue, and elegantly pendulous position. They mostly blossom in spring and early summer, about the same time as the grasses.

The Cyperaceæ are distributed freely all over the world, growing in every habitat in which it is possible for flowering plants to live, from the hottest and driest to the coldest and marshiest. Woods, rivers, ponds, swamps, moors, mountains, the dry, drifting sandbanks on the sea-shore, are occupied more or less abundantly by their representatives, the total number of species being estimated at two thousand. Broadly speaking, they are plants of little direct utility. The hard and juiceless herbage, destitute of saccharine principles, prevents their being eaten as fodder or pasturage; the only purpose they seem to serve is the binding together soil otherwise loose and impassable, and thus preparing the way for the implements of the agriculturist. The neighbourhood of Manchester, from its generally low-lying level, and wet character, and the numerous mosses and moors, ponds or "pits," damp cloughs and swampy hollows, with no outlet for their waters, which are found in almost every direction, and which are favourite residences with a large proportion of the British species,—is rich in Cyperaceæ. Out of about eighty native species, we have in our Flora no less than forty-nine. A large portion are pretty and interesting plants, but they are a difficult tribe to study. It is necessary to watch most through their entire progress from the period of blooming to that of the ripening of the fruit, and many species can only be told with certainty when the latter is perfect. The "cotton grasses," or "silver-tassels," which so charmingly adorn our moorlands in early summer with vegetable snow, are while in bloom quite insignificant. Ornamental plants, fit for the garden, this family can hardly be said to supply. One or two foreign species of *Cyperus*, the little green-tufted *Isolepis repens*, and the celebrated *Papyrus* of the Nile, all of them inmates of the conservatory, comprise perhaps the whole. The Papyrus is a magnificent plant, throwing up numerous round green stems, five or six feet high, and the thickness of one's finger, and crowned with large compound umbels of green flowers, the innumerable primary rays twelve or fourteen inches long, and as fine as hair, so that the umbels form beautiful half-pendent spheres of a foot or more in diameter.

PRELIMINARY ANALYSIS.

A.—Spikelets forming irregular panicles, umbels, or corymbs, which are either terminal, or very nearly so.

B.—Heads of flowers clustered, two or three to five or six, or many more, together, forming spikes of one to six inches in length, and more or less interrupted, the heads almost invariably sessile, p. 444.

C.—Spikelets forming compact, cylindrical or ovate, and terminal heads, p. 446.

D.—Lower heads or clusters of flowers axillary.

* Heads, or at least the lower ones, all sessile, or nearly so, p. 448.

** Lower or axillary catkins on long peduncles, and all female ; the terminal one male.

Stigmas two, p. 448.

Stigmas three, p. 448.

Fruit downy or hairy, p. 448.

Fruit glabrous.

A. One terminal male catkin (rarely with a smaller one close underneath it). *Female catkins erect.* Bracts leafy, with sheaths, p. 448.

B. One terminal male catkin. *Female catkins more or less pendulous.* Bracts with sheaths, rarely without, p. 449.

C. Two or three male catkins. Bracts without sheaths. (The lowest one rarely with a sheath), p. 450.

PARTICULAR ANALYSIS.

A.

Spikelets forming irregular panicles, umbels, or corymbs, which are either terminal, or very nearly so.

*

Stem leafless, except a single short leaf near the base.

Stems erect, slender, two or three to six or eight feet high, and cylindrical, or nearly so. Spikelets brown, egg-shaped, about half an inch long, rather numerous, and clustered into an irregular terminal compound umbel, which is rendered apparently lateral by the outer bract growing an inch or two beyond it..... 3. Lake Scirpus.

**

Stem with a few leaves upon it.

Stems two to three or four feet high. Spikelets small, but very numerous, and disposed in much branched, terminal panicles, which are either upright, or spreading and corymbose.

Spikelets dark grayish green. Stems triangular, two or three feet high, with long, grass-like leaves. Panicle corymbose, six or eight inches in diameter, with two or three long linear and leaf-like bracts at the base ..... 5. Great Wood Scirpus.

Spikelets decidedly brown.

a. Rootstock creeping. Stems stout, rounded, and leafy; the margins and keel of the leaves prickly with minute teeth. Spikelets in small but very numerous clusters, produced from the upper axils, the whole forming a terminal, more or less leafy panicle, twelve or fourteen inches long. Flowers bisexual. Stamens usually two.. 1. CLADIUM.

b. Rootstock tufted. Stem with three acute, rough angles. Spikelets arranged on elongated and diverging branches at the upper extremity, and forming a narrow spicate panicle, three to six inches long. Flowers unisexual. Stamens three ..... 25. GT. PANICLED SEDGE.

c. Similar to the preceding, but smaller and slenderer in all its parts, growing in separate tufts, and the stem rather rounded..... } 26. ROUND-STALKED SEDGE (when luxuriant).

Stems six to fifteen inches high. Leaves chiefly radical.

Stems very slender, without any creeping rootstock. Leaves few, short, and very fine. Spikelets nearly white, in little loose terminal clusters, scarcely half an inch long, often with one or two smaller clusters on slender peduncles in the axils of the leaves below ..... 2. WHITE BEAK-RUSH.

Stems with a creeping rootstock. Leaves hard, broad, and often channelled. Spikelets egg-shaped, half an inch long, olive-green, in a terminal umbel of two or three to ten or twelve, the inner ones sessile, the outer ones on peduncles which are often two or three inches long, and droop elegantly. When in fruit, these become large and very beautiful silky tassels of a shining white, caused by the growth of hypogynous bristles ..... } 13. MANY-HEADED COTTON-GRASS.

B.

Heads of flowers clustered, two or three to five or six, or many more, together, forming spikes of one to six inches in length, and more or less interrupted; the heads almost invariably sessile.

*

Flowers in distinct male and female heads or catkins, a male one at the summit of the stem, and terminating it, and two or more sessile female catkins immediately underneath.

Catkins elliptical; females usually two, close, on short stalks, which are covered by the sheaths. Fruit obovate, acute. Stems three to nine inches high. 42. SPRING CAREX.

Catkins nearly globular; females about three. Fruit almost globular. Stems twelve inches high .. 43. PILL CAREX.

**

Flowers not in distinct male and female catkins; the lower spikelets either female or mixed; the terminal one always mixed, *i. e.*, containing both male and female flowers.

A leaf-like bract, two or three inches long, under the lowermost head. Lower spikelets very distant; the lowermost often two or three together. Stems very slender, eighteen inches to two feet high. Flowers greenish ..... 21. Axil-flowered Carex.

No such bract under the lowermost head.

Flowers brown, or at least more brown than green.

Spikelets few, oval, shining, large, close together, each with a large egg-shaped bractea at the base. Stems twelve to eighteen inches high 17. Oval-spiked Carex.

Spikelets small and generally numerous; if only a few, not oval.

Rootstock long and creeping; stems twelve to eighteen inches high; spikelets crowded, rusty brown ..... 22. Soft Brown Carex.

Stems tufted, without creeping rootstocks.

a. Spikes light-brown, large, thick, cylindrical, two to three inches long. Stem eighteen inches to two feet high, stout, rough, sharply triangular, with concave sides, and abruptly contracted at the summit. Leaves long, broad, rough at the margins and keel..... 24. Fox Carex.

b. Spikelets darkish-brown, variegated with green.

Spike short, dense, prickly with the spreading beaks of the fruit. Stems twelve to fifteen inches high. Spikelets four to six ..... 23. Prickly Carex.

Spikelets numerous, rather distant, long, and narrow. Stems two feet high. 19. Elongated Carex.

c. Spikelets dark-brown, without intermixture of green. Spike loose and rather compound.

Stem three-cornered, with flat sides, two to four feet high. Spike two to six inches long..... 25. Gt. Panicled Carex.

Stem three-cornered, with convex sides, so as to be nearly cylindrical, eighteen to twenty-four inches high. Spikes dense, one to three inches long..... 26. Round-stalked Carex.

Flowers green, or at least more green than brown.
Spikelets, or at least the lower ones, slightly distant, and all of them simple.
Fruits erect, ovate, with a minute point. Spikelets five or six, alternate, short, oval, pale, and silvery. Stems twelve to eighteen inches high. Leaves erect, narrow, and rough ..... 18. White Carex.
Fruits tapering to a point, few, spreading in all directions; spikelets three or four, nearly globular when ripe. Stems six to eight inches high ..... 16. Little Star Carex.
Spikes dense, oblong, the lower spikelets often a little compound.
Spikes large, two to three inches long, cylindrical. Stem two feet high, stout, rough, acutely triangular, with concave sides, and abruptly contracted at the summit. Leaves very long, broad, rough at the margins and on the keel ..... 24. Fox Carex.
Spikes small, not much exceeding an inch in length; spikelets four to six. Stem twelve to fifteen inches high. Fruits acutely angular, yellowish ..... 23. Prickly Carex.

C.

Spikelets forming compact, cylindrical or ovate, and terminal heads, which are usually solitary, and never more than two together. When there are two, the outer bract is continued beyond them, and makes it appear as if they were lateral.

*

Flowers in separate male and female catkins on separate plants.

Flower-stems six to eight inches high; leaves very short; male catkins linear, female ones egg-shaped ..... 14. Dioecious Carex.

**

Stamens and pistils both on the same plant, and usually in the same flower.

Spikelets in pairs, grayish, minute. Stems two to five inches high, densely tufted ..... 4. Bristle Scirpus.
Spikelets solitary and quite terminal.
Plant floating in water.
Stems branched, often matted, very slender .... 11. Floating Spike-rush.

Plant growing on land, or if in marshy places, not floating; the stems simple, erect, and usually rigid.

Flowers unisexual. Stems three to six inches high. Fruits, when ripe, dark-brown, rather distant, spreading horizontally, and resembling fleas; the spike altogether about an inch long ..... 15. Flea Carex.

Flowers bisexual; three stamens and a pistil being in company under every scale of the spikelet.

Flower-stalk leafless and sheathless, unless quite at the base.

Stalks as fine as hair, two or three inches high; root with thread-shaped runners ..... 10. Needle Spike-rush.

Stalks rigid, usually four to twelve or fifteen inches high.

Styles mostly two-cleft. Stems numerous, eight to twelve inches high. Spikelets half an inch long ..... 6. Common Spike-rush.

Styles mostly three-cleft.

Sheaths at the base of the stem without any leafy tip. Spikelets oblong.

Flowers numerous in each spikelet. Plant resembling No. 6..... 7. Many-stalked Spike-rush.

Flowers three to six in each spikelet. Stems six inches high ..... 8. Few-flowered Spike-rush.

Sheaths at the base of the stem, each with a short leafy tip; the sheaths closely imbricated, the outer ones brown, the inner ones green. Stems two to twelve inches high, densely tufted, and very rigid. Flowers light-brown, six to eight in each spikelet ..... 9. Heath Spike-rush.

Flower-stalk with one or two sheaths upon it (the upper one remarkably inflated), sometimes ending in short leaves. Herbage densely tufted; stems ten to twelve inches high. Spikelet erect, egg-shaped, half an inch long, deep olive-green; when in fruit becoming a nearly globular, silvery-white and very beautiful silky tuft, an inch or more in diameter, owing to the growth of interior bristles ..... 12. Hare's-tail Cotton-grass.

D.

Lower heads or clusters of flowers in the axils either of leaves, or of very long and leaf-like bracts; the uppermost head usually terminating the stem.

*

Heads, or at least the lower ones, all sessile, or nearly so.

Heads very small, numerous, in the axils of long and leaf-like bracts, about two inches asunder. Herbage pale, slender, and densely tufted; stems eighteen inches high ..... 20. Remote-flowered Carex.

Male and female flowers in separate heads, the terminal one a catkin, with stamens only; the lower ones all female.

Heads few, roundish, yellowish-green, mostly near the top of the stem. Fruits very spreading. Stems three to eight inches high..... 30. Small Yellow Carex.

Heads few, large, oval, the females one or two inches long. Stems two feet high. Fruit egg-shaped, inflated ..... 47. Bladder Sedge.

**

Lower or axillary heads or catkins on peduncles, which are usually of considerable length, the longest reaching to 3—5 inches, and all of them female; the terminal catkin male.

Stigmas two. Catkins cylindrical or oblong, few, dark-brown or blackish. Fruits nearly flat.

Scales mostly *obtuse;* female catkins one or two inches long ..... 27. Tufted Bog Sedge.

Scales mostly *narrow and pointed;* female catkins three inches or more in length ..... 28. Slender-spiked Carex.

Stigmas three. Bracts, or at least the lower ones, leafy, and with or without sheaths.

Fruits downy or hairy, beaked. Female catkins oblong or cylindrical, the lower ones very distant. Rootstock creeping extensively underground. Stems 4—15in. high. Whole plant more or less covered with fine white hairs .. 45. Hairy Sedge.

Fruits glabrous.

A. One terminal male catkin (rarely with a smaller one close underneath it). *Female catkins erect.* Bracts leafy, with sheaths.

Fruits obtuse, without any beak, or only a very minute one.

Female catkins short, oblong, pale-green. Fruits very obtuse. Stems twelve to fifteen inches high ..... 32. Pale Carex.

Female catkins cylindrical. Scales very dark-coloured. Fruit often with a minute beak. Stems six to twelve inches high. 35. Pink-leaved Carex.

Fruits tapering into a beak.
Female catkins compact, nearly sessile. Leafy bracts short, very rarely exceeding the stem.
Female catkins short, yellowish-green, mostly near the top of the stem. Fruits very spreading. Stems three to eight inches high. Plant yellowish green ..... 30. Small Yellow Carex.
Female catkins oblong, brown, very distant. Fruits with an erect or slightly spreading beak, and ribbed.
a. Stems twelve to fifteen inches high. Fruits ovate, angular ..... 31. Tawny Carex.
b. Stems two to four feet high. Fruit with two prominent green ribs near the margin ..... 33. Green-ribbed Sedge.
c. Stems two to four feet high. Fruit ovate, triangular, convex, very acuminate ..... 34. Smooth Sedge.
Female catkins loose, cylindrical, stalked.
Female catkins brown. Fruits with a very short beak. Stems six to twelve inches high ..... 35. Pink-leaved Carex.
Female catkins green. Fruits with a long beak.
Peduncles of the lower catkins very long. Stems twelve to twenty inches high. Plant delicate ..... 37. Common Wood-sedge.
Peduncles of the lower catkins short.
a. Stems twelve to fifteen inches high. Fruits ovate, triangular ..... 31. Tawny Carex.
b. Stems two to four feet high. Fruit with two prominent green ribs near the margin ..... 33. Green-ribbed Sedge.
c. Stems two to four feet high. Fruit ovate, triangular, convex, very acuminate ..... 34. Smooth Sedge.

B. One terminal male catkin. *Female catkins more or less pendulous.* Bracts with sheaths, rarely without.
Female catkins brown; fruits not beaked. Stems six to twelve inches high.
Fruits compressed. Female catkins egg-shaped, dense ..... 36. Green and Gold Carex.
Fruits egg-shaped. Female catkins cylindrical, drooping, on very long recurved stalks ..... 41. Glaucous Heath Carex.

Female catkins green or yellowish-green.
Female catkins oblong, less than an inch in length, slightly drooping. Fruits not beaked. Lower bracts leafy, with short sheaths. Stems twelve to fifteen inches high ..... 32. Pale Carex.
Female catkins one to six inches long.
Female catkins distant. Stems weak and leafy.
Female catkins one or two inches long, on slender stalks. Fruit rather long-beaked ..... 37. Common Wood-sedge.
Female catkins two to three inches long, very slender, their stalks almost concealed in the leaves. Fruit short-pointed ..... 38. Strigose Wood-sedge.
Female catkins not very distant. Flowers crowded. Stems stout, three to four feet high.
Female catkins about two inches long, dense, on slender stalks. Scales and fruits spreading, with long points ..... 40. Great Pond-sedge.
Female catkins very slender, four to six inches long. Stalks almost concealed in the sheaths. Fruits small, scarcely beaked ..... } 39. Great Pendulous Wood-sedge.

c. Two or three male catkins. Bracts without sheaths. (The lowest one rarely with a sheath.)

Fruits obtuse. Catkins dark brown. Leaves glaucous. Stems three to twelve inches high .. } 41. Glaucous Heath Carex.

Fruits beaked or pointed. Catkins black or brownish-green. Stems one or two feet high, with long leaves.
Fruits much flattened, pointed. Catkins erect, black or deep brown.
Male catkins generally three, cylindrical, and obtuse. Herbage glaucous. Stems eighteen inches to two feet high ..... 48. Black Swamp Sedge.
Male catkins three to five, pointed, and triangular. Stems two to four feet high.. 49 River-side Carex.
Fruit inflated.
Fruit globular, abruptly contracted into a long beak. Fertile catkins nearly sessile; the fruits copious and crowded, yellowish .. 46. Flask-fruited Sedge.
Fruit tapering into a short beak. Female catkins short, abrupt, a little drooping.... 47. Bladder Sedge.

HABITATS AND LOCALITIES.

1. Cladium—(*Cládium Mariscus.*)

On the Bowdon side of Rostherne Mere, the only station known in this neighbourhood. Fl. July, August.

E. B. xiv. 950 (as *Schœnus Mariscus*).

2. White Beak-rush—(*Rhyncóspora alba.*)

Wet moors and heaths. Lindow Common. Chat Moss. Barton Moss. (J. S.) Very abundant on Carrington Moss, and on Shaw's Heath, Knutsford. (Mr. Holland.) Fl. August.

E. B. xiv. 985 (as *Schœnus albus*).

3. Common Lake Scirpus—(*Scirpus lacústris.*)

Edges of ponds and lakes, rare. North-west borders of Rostherne Mere. Edges of Radnor Mere, Alderley Park. Brereton Mere, Congleton. Fl. June, July.

Curtis, iii. 442; E. B. x. 666.

4. Bristle Scirpus—(*Scirpus setáceus.*)

Moist, sandy, and gravelly places, and by waysides, frequent. Above Jack's Bridge, near Boggart Hole Clough. Banks of the Tame, near Apethorne. Alderley Edge. Hale Moss. Pilkington. (J. P.) Fl. July, August. Annual?

Curtis, iii. 445; E. B. xxiv. 1693.

5. Great Panicled Scirpus—(*Scirpus sylváticus.*)

Marshy places, especially where shaded by trees, common. Abundant at the foot of Mere Clough; in fields between Agecroft; between Ashley and Cotterill; near Pendlebury, and in Burley Hurst Wood, Mobberley. Fl. July, August.

E. B. xiii. 919.

6. Common Spike-rush—(*Eleócharis palústris.*)

In wet and marshy places, and on the borders of ponds, along with rushes and Equisetums, common. Baguley. Chorlton. Hale Moss. Fl. June, July.

E. B. ii. 131 (as *Scirpus palustris*).

7. Many-stalked Spike-rush—(*Eleócharis multicaulis.*)

Similar situations, but rarer. Stretton Moss, near Warrington. Eaton Moss, near Congleton. Fl. June, July.

E. B. xvii. 1187.

8. Few-flowered Spike-rush—(*Eleócharis pauciflóra.*)

Hale Moss, abundant. Fl. July.

E. B. xvi. 1122 (as *Scirpus pauciflórus*).

9. Heath Spike-rush—(*Eleócharis cæspitósa.*)

On all the moors and mosses about Manchester, plentiful. Fl. May, June.

E. B. xv. 1029 (as *Scirpus cæspitosus*).

10. Needle Spike-rush—(*Eleócharis aciculáris.*)

On the borders of Mere Mere, abundant. Worsley. (J. E.) "Near Knutsford." (B. G.) Fl. July, August.

Curtis, iii. 446; E. B. xi. 749 (both as *Scirpus acicularis*).

11. Floating Spike-rush—(*Eleócharis flúitans.*)

In ditches and ponds, especially where sometimes dried up, and in shallow water on heaths, rather uncommon. Chorlton. Withington. Baguley. Near Boothstown. (J. E.) Fl. August.

E. B. iii. 216 (as *Scirpus fluitans*).

12. Hare's-tail Cotton-grass—(*Eriόphorum vaginátum.*)

On all our heaths, moors, and mosses, in abundance. Carrington Moss, approached from Sinderland, and thus viewed as a gentle incline upwards, seems, when it is in fruit, as if covered with snow. Fl. March, April. Tassels in May and June.

Curtis, ii. 227; E. B. xiii. 873.

13. Many-headed Cotton-grass—(*Eriόphorum polystáchyon.*)

With the preceding, and equally abundant. Fl. April. Tassels end of May and beginning of June.

Curtis, ii. 226; E. B. viii. 563; also viii. 564 (as *E. angustifolium*).

When in fruit, there is scarcely anything in our indigenous Flora of more charming beauty. (See "Walks and Wild-flowers," chap. v.) Botanists formerly made two species of it, the narrow-leaved and the broad-leaved.

14. Diœcious Carex—(*Carex dioica.*)

Marshy and boggy places, rare. Knutsford Moor. (Mr. Holland.) Plentiful in the boggy parts of Hale Moss. Top of Werneth Lowe, tolerably plentiful. Fl. May, June.

E. B. viii. 543.

15. Flea Carex—(*Carex pulicáris.*)

Heathy ground and on moors, not uncommon. Baguley. Between Hyde and Apethorne. Greenfield. Plentiful near Rostherne Mere and on Hale Moss. Coutacre Clough. (R. H.) Prestwich. (J. P.) Fl. June, July.

Curtis, iv. 640; E. B. xv. 1501.

16. Little Star Carex—(*Carex stelluláta.*)

Marshy and heathy ground, not uncommon. Baguley. Hill-side opposite Reddish Mill, plentiful. Hale Moss, plentiful. Near Rostherne Mere. Fl. May, June.

E. B. xii. 806.

17. Oval-spiked Carex—(*Carex ovális.*)

Low, wet meadows and in swampy places, common. Agecroft. Moston. Chorlton. Greenheys fields. Old Trafford. Sale. Fl. June, July.

E. B. v. 306.

18. White Carex—(*Carex curta.*)

Boggy and watery places, sides of ponds, and in ditches, especially on the borders of the mosses, common everywhere. Harpurhey. Moston. Chorlton. Withington. Carrington Moss. Lindow Common. Chat Moss. Fl. June, July.

E. B. xx. 1386.

19. Elongated Carex—(*Carex elongáta.*)

Marshy places, and by pondsides, rare. Three Lane Ends, Chorlton. Longford, and between Chorlton and Stretford, and many other places in that district, both in ditches and by ponds. Edge of Rostherne Mere. Tyldesley. (J. E.) Between Eccles and Swinton. (J. S.) Fl. June.

E. B. xxvii. 1920.

20. Remote-flowered Carex—(*Carex remóta.*)

Ditch-banks, sides of ponds, and in moist woods and cloughs, very common. Agecroft Clough. Mere Clough. Bottoms Hall Wood. Fl. May, June.

E. B. xii. 832.

21. Axil-flowered Carex—(*Carex axilláris.*)

Woods and shady ditch-banks, very rare. Cotterill Clough. "Lane in West Leigh." (B. G.) Fl. June.

E. B. xiv. 993.

The form called by some botanists *Carex Bœnninghauseniana*, (E. B. Supp. iii. 2910.) grows in a dingle near Capesthorne Mere, and in a wood near Brookhouse Moss. (Mr. Sidebotham.)

22. Soft Brown Carex—(*Carex intermédia.*)

"Near the borders of Rostherne Mere, and near White Moss." (B. G.) Fl. June.

E. B. xxix. 2042.

23. Prickly Carex—(*Carex muricáta.*)

Dry fields and hedgebanks, rare. Hedgebank by the road-side between Stockport and Marple, plentiful. (Mr. Sidebotham.) Fl. May, June.

E. B. xvi. 1097.

24. Fox Carex—(*Carex vulpina.*)

Wet, shady places, especially near water, not uncommon. Cotterill Clough, plentiful. Common near Styal, and about Leigh. (J. E.) About Reddish, tolerably common. Ashley. Fl. May—July.

E. B. v. 307.

25. Great Panicled Carex—(*Carex paniculáta.*)

Swampy and spongy pastures, in cloughs, and on the borders of ponds and canals, common. Prestwich dells. Marshy fields at Pendlebury. Banks of the canal at Clifton. Chorlton. Didsbury. Rostherne Mere. In the Reddish valley, opposite Arden Hall. Very abundant by the water below Disley Railway Station. Fl. June, July.

E. B. xv. 1064.

26. Round-stalked Carex—(*Carex teretiúscula.*)

Boggy and watery places, and by pondsides, rather uncommon. Plentiful in ponds at Back Levenshulme. Sparingly at Seaman's Moss Pits. Fl. May, June.

E. B. xv. 1065.

The variety "*Ehrartiana*" is plentiful at Seaman's Moss Pits, and also grows in a boggy place near Hough End.

27. Tufted Bog Sedge—(*Carex vulgáris.*)

Swampy places, in low wet pastures, and on the borders of the mosses, common. Agecroft hills. Greenheys fields. White Moss. Fl. May, June.

E. B. xxi. 1507 (as *Carex cæspitosa*).

This is the plant called by some botanists *Carex Goodenóvii*.

28. Slender-spiked Carex—(*Carex acúta.*)

Moist meadows and swampy places. Near the excavations for the intended canal above Reddish, tolerably plentiful. Margin of Rostherne Mere, abundant, and in one or two places in Chorlton fields. Fl. May.

Curtis, ii. 282 (as *Carex gracilis*); E. B. ix. 580.

29. Straight-leaved Carex—(*Carex cæspitósa.*)

Borders of Rostherne Mere, the only locality known in this neighbourhood. Fl. May.

E. B. xiii. 914 (as *Carex stricta*).

30. Small Yellow Carex—(*Carex Œdéri.*)

Moist, boggy places, in low, wet meadows and pastures, and on the mosses, abundant. Fl. May, June.

E. B. xxv. 1773.

Easily distinguished by its small size, being rarely more than four or five inches high, yellowish-green colour, and the sessile heads with long straight beaks to the fruit. This plant has been commonly confounded with the *Carex flava*, (E. B. xviii. 1294.) but the latter does not grow near Manchester. On the banks of the canal at Kendal and near Lancaster it may be gathered in abundance. (Mr. Sidebotham.)

31. Tawny Carex—(*Carex fulva.*)

Boggy meadows and pastures, not uncommon. Between Hyde and Apethorne, near the railway, abundant. Werneth Lowe. Several places about Reddish. Hale Moss. Fl. July.

E. B. xviii. 1295.

32. Pale Carex—(*Carex palléscens.*)

Wet, shady places, rather uncommon. Woods near Reddish Mill. Bottoms Hall Wood. Mere Clough, on the bank above the reservoir, on the left hand, descending from Prestwich. Near Burley Hurst Wood, Mobberley. Near Marple Aqueduct. Coutacre Clough. (R. H.) Cotterill and Ashley. Fl. June, July.

Curtis, iv. 641; E. B. xxxi. 2185.

33. Green-ribbed Sedge—(*Carex binervis.*)

Moist, shady places, rather rare. Mere Clough. Alderley Edge. Between Hayfield and Kinder Scout, and near Tintwistle, on the sides of the hills, tolerably abundant. Fl. July.

E. B. xviii. 1235.

34. Smooth Sedge—(*Carex lævigata.*)

Wet, shady places, rather uncommon. Mere Clough, with the *C. pallescens.* Hurst Clough, between Stand and Outwoods. Boggart Hole Clough. Marple. Reddish. Rostherne. Congleton. Fl. June.

E. B. xx. 1387.

35. Pink-leaved Carex—(*Carex panicéa.*)

Marshy places, common. Agecroft hills, abundant. Slope above the reservoir at the foot of Mere Clough. Fl. May, June.

E. B. xxi. 1505.

36. Green and Gold Carex—(*Carex limósa.*)

Brookhouse Moss, near Congleton, abundant. Fl. June.

E. B. xxix. 2043.

One of the most elegant native species of Carex, especially in the bronze hue of the catkins, which well entitles it to the name of "green and gold." The discovery of it in this neighbourhood came of the diligence of the late lamented E. S. Wilson, who had he lived, would have become one of the most distinguished botanists of his generation.

My sprightly neighbour, gone before,
To that unknown and silent shore,
Shall we not meet, as heretofore,
Some summer morning?
When from thy cheerful face, a ray
Of bliss hath struck across the day,
A bliss that could not go away,
A sweet forewarning?

37. Common Wood Sedge—(*Carex sylvatica.*)

Moist woods and cloughs, abundant. Cotterill Clough, and Burley Hurst Wood, Mobberley, abundant. Agecroft Clough. Woods near Broadbottom. Woods at Styal. Reddish Wood. Fl. May, June.

E. B. xiv. 995.

38. Strigose Wood Sedge—(*Carex strigósa.*)

Moist woods and cloughs, rare. Cotterill Clough, on the borders of the stream, about half way up, plentiful. Marple Wood and woods in the Reddish valley. (Mr. Sidebotham.) Fl. May, June.

E. B. xiv. 994.

39. Great Pendulous Wood Sedge—(*Carex péndula.*)

Moist woods and shady places, rather uncommon. Cotterill Clough. Boggart Hole Clough. Marple Wood. Banks of the Tame, near Reddish. Red Brows Wood, near Didsbury. Left bank of the Goyt, below Marple Aqueduct. Abundant in the steep wood by Ashley Mill. Haughton Dale. Fl. May, June.

Curtis, i. 208; E. B. xxxiii. 2315.

Well marked by its long, dense, curved, and pendulous catkins, bearing more fruit than any other British species.

40. Great Pond Sedge—(*Carex Pseudo-cypérus.*)

Edges of ponds, and in marshy places, common everywhere. Rusholme. Styal. Hale Moss, with the *Acorus Calamus*, abundant and exceedingly fine. Fl. June.

E. B. iv. 242.

This and the preceding are the two handsomest of our native sedges. The great prickly cylinders of unripe fruit, pendulous on hair-like stalks often five or six inches long, form a strikingly beautiful ornament of the pondsides in early summer.

41. Glaucous Heath Carex—(*Carex glauca.*)

Moist meadows and moors, common everywhere. Fl. May, June.

E. B. xxi. 1506 (as *Carex recurva*).

Known immediately by its glaucous foliage, resembling that of a carnation.

42. Spring Carex—(*Carex præcox.*)

Dry pastures, banks, heaths, and in parks, frequent. Agecroft Park. Dunham Park. Prestwich. Fl. May, June.

Curtis, iii. 548; E. B. xvi. 1099.

43. Pill Carex—(*Carex pilulifera.*)

Moors and on heathy hill-sides, not rare. In the neighbourhood of Mere Clough, and elsewhere at Prestwich. Kersall Moor. Agecroft. Baguley. Alderley. Hale Moss. Mobberley. Fl. May, June.

E. B. xiii. 885.

44. Thread-leaved Carex—(*Carex filiformis.*)

Brookhouse Moss, near Congleton, abundant, growing with the *C. limosa*. Fl. May.

E. B. xiii. 904.

45. Hairy Sedge—(*Carex hirta.*)

Wet meadows and pastures, and especially by the sides of the trenches cut for draining them, common. Abundant in Greenheys fields. Dunham Park. Sale. Blakeley. Fl. May, June.

E. B. x. 685.

Immediately distinguished by its copious clothing of fine soft hairs, though in very wet situations the quantity is sometimes diminished.

46. Flask-fruited Sedge—(*Carex ampullácea.*)

Pondsides, and by meres and lakes, tolerably common. Three Lane Ends, Chorlton. Hale Moss. Agecroft. Borders of Radnor Mere, Alderley Park. Back Levenshulme. Borders of Rostherne Mere, abundant. Plentiful about Middleton and Pilkington. (J. P.) Bedford, near Leigh. (R. H.) Borders of the old mere below Disley Railway Station. Fl. May, June.

E. B. xi. 780.

47. Bladder Sedge—(*Carex vesicária.*)

In similar situations but less common. Borders of Radnor Mere, Alderley Park. Borders of Mere Mere, plentiful. Ponds near Three Lane Ends, Chorlton. Near Red Brows, Didsbury. Borders of Disley Mere, with the preceding. Fl. May, June.

E. B. xi. 779.

48. Black Swamp Sedge—(*Carex paludósa.*)

Marshy places, and on the borders of water, common. Exceedingly fine and plentiful at the foot of Mere Clough and at the edge of Rostherne Mere. Barlow Wood. Reddish. Levenshulme. Swamp in Burley Hurst Wood, Mobberley. Seaman's Moss Pits. Hale Moss. Fl. June.

Curtis, ii. 281 (as *Carex acúta*); E. B. xii. 807.

The stems of this and the other large, coarse semi-aquatic sedges are in Cheshire called "sniddel," and used for putting on the cheese-room floors, as they do not give way so soon as the straws of grass or cereals, and seem to allow of better ventilation. (Mr. Holland.)

49. River-side Carex—(*Carex riparia.*)

Banks of rivers and streams, and in marshy places, rather rare. Borders of Rostherne Mere, plentiful. Near Astley and Tyldesley. (J. E., R. H.) Fl. May, June.

Curtis, ii. 280; E. B. ix. 570.

The largest and stoutest of our native sedges.

INTERMEDIATE FAMILIES. (See page 46.)

CXLVI.—THE FIR-TREE FAMILY. *Coniferæ* or *Pináceæ.*

A magnificent family of trees and shrubs, the former, when at the acmè of their development, presenting some of the finest objects of living nature. The number of species is inconsiderable, probably not over two hundred, but this is forgotten in the vastitude of the forests they often compose, and in the prodigious bulk and the immense altitude attained by individuals. Sixty to eighty feet is quite a common elevation; many kinds grow twice as tall; the stupendous pines of North-west America rise frequently to the height of two hundred and

Fig. 204.
Cone of Larch (natural size).

fifty feet; while the colossal *Wellingtonias* of California, attain, in fine specimens, the almost incredible height of four hundred feet, with a thickness of nearly forty feet at the height of a man from the ground! The diameter of the base of the specimen, the bark of which is in the Crystal Palace at Sydenham, rebuilt into the position it occupied before taken from the tree, was thirty-one feet.* The longevity of many kinds is on a par with their dimensions. The ordinary age is one or two hundred years, and there seems no reason to doubt that the oldest *Wellingtonias* have been growing for fully five thousand years. Great portions of the northern regions, both of the old world

* See the *Times* of February 17th, 1850.

and the new, are almost exclusively occupied by forests of the splendid genera *Abies* and *Pinus*; the traveller pursues his way among them for days and weeks together, without witnessing any abatement of the mighty produce. In temperate and hot countries they are less abundant, but there are few which, at least upon the mountains, do not possess representatives of this superb and truly patriarchal family. Their uses are not inferior to their grandeur. The timber is known as deal, cedar, and larch; the trunks serve as masts for ships; resin, turpentine, pitch, and other substances of similar nature are yielded by them in the greatest plenty, while many species furnish eatable seeds.

There are two principal tribes of the Coniferæ, one represented by the cedar, pine, and fir; the other by the cypress and the juniper. In both the stem is much branched, and the wood resinous: in both the leaves are small, narrow, and usually evergreen; the flowers very incomplete, individually minute, unisexual, and often dicœcious, but attractive, in many cases, from their abundance. The technical difference between the two tribes lies in the pollen and in the seed, the true Conifers, or *Abietineæ*, having the grains of pollen oval and curved, and the ovules inverted; while the *Cupressineæ* have spheroidal pollen and erect ovules. Practically they may be distinguished by their branches, foliage, and fruit.

I.—ABIETINEÆ.

The true Conifers are nearly all of lofty stature and pyramidal form, and furnished with regularly whorled branches that extend from near the base of the stem to the summit. The leaves are generally needle-shaped, and several inches long, though sometimes much less, and occasionally lanceolate and flat. The male flowers generally grow in dense clusters of a fine reddish orange-colour, surrounding the twigs, and with tufts of leaves above them, so as to present the figure of a little pine-apple; the females lie in the axils of imbricated scales, which in due course enlarge and harden, and consolidate into the well-known production called the fir-cone or "fir-bob." (Fig. 204.) In different species these "cones" take two or more years to ripen, so that the products of several past seasons may often be found side by side on the same branch. The pollen is very copious, and if the boughs be slightly shaken, descends in showers. The flowers appear, for the most part, in May and June.

The principal genera are distinguished by the following characters:

1. Pine-trees (genus *Pinus*). Most of the species placed here are spreading and flat-headed trees. The leaves are needle-shaped, several inches long, and grow two, three, or five together, surrounded at the base by brownish sheaths. The cones are oval and generally erect, with their scales woody and much thickened at the extremity. The young shoots are perpendicular to the ground, standing up like long green fingers, whatever the angle of the branches with the trunk.

2. Fir-trees (genus *Abies*). In figure these are conical or steeple-shaped; the leaves are needle-shaped, *solitary*, and more or less two-ranked; the cones are pendent, their scales thin and paper-like, without any thickening at the extremity; and the young shoots spread out horizontally.

3. Silver-firs (genus *Picea*). These differ from the true firs in their erect cones, and decidedly two-ranked leaves, silvery underneath.

The Larch (*Larix*) and the Cedar (*Cedrus*) are distinguished from all the preceding by their short and deciduous leaves growing in dense tufts. The scales of the cones are like those of the fir-trees, thin and paper-like.

II.—CUPRESSINEÆ.

The Cupressineæ (with the exception of the great *Taxodium distichum*) are low shrubs or small trees; their branches are not disposed in regular whorls; and the leaves (except in the junipers) are very minute, scale-like, and closely pressed against the surface of the branches and twigs. The flowers also are very minute, and the cones of a different form from those of the Abietineæ, and called *galbuli*. The principal genera are characterised as follows:—

Fruit a dry galbulus. Leaves appressed.
Scales one-flowered; galbulus angular ..... *Cupressus.*
Scales two-flowered; galbulus winged ..... *Thuja.*
Fruit berry-like, in consequence of the scales of the galbulus becoming fleshy. Leaves linear and spreading ..... *Juniperus.*

The only indigenous species of the Coniferæ are the common juniper and the Scotch fir, the latter abundant in Dunham Park, at Alderley, and in parks and plantations generally. At one period it was probably truly wild in our neighbourhood. Two others, the larch and the Norway spruce-fir, are now so general in the same and similar places that they have quite as much the appearance of aborigines. These three are the only common ones, except in choice gardens and pleasure-grounds, and, though several others produce blossoms, the only three that ripen their cones. It is not improbable that in a few years others will be planted quite as extensively, especially the incomparable *Deodara*, already so beautiful on the hills between Coniston and Hawkshead, where these grand trees grow, rejoicing in the mountain air, as freely as upon their own Himalayahs.

The Scotch fir (*Pinus sylvestris*, E. B. xxxv. 2460.) is an evergreen tree of considerable size, the trunk simple or forked, with reddish bark, and a rather obtuse crown of dark-hued foliage. The leaves are needle-shaped, two to three inches long, and grow in pairs; the cones, well known to children, are an inch and a half long, and when ripe, and lying on the ground, where they may be seen in profusion, have their large brown scales curved widely outwards. Looked at from a little distance, as across the sward of Dunham Park, when the rays of the setting sun light up the red-barked stems and branches, the contrast of the dark foliage is fine and unique, as that of the tree itself with all others. The appearance of our mountain districts is considerably influenced by the extent to which it has been planted. Large square or oblong platoons, belts, and irregular masses, so disposed as to give shelter to farms, are common. Inside, however, they are gloomy, presenting monotonous ranges of tall straight poles, while the ground is strewed with the dead brown needles and decaying cones.

The Larch (*Larix Europæa*) is a tree equal in stature to the Scotch fir, but of widely different feature, and singularly graceful. The branches, which begin from near the ground, bend downwards in elegant concaves, producing innumerable slender twigs, which are thickly covered with little tufts of light-green leaves about an inch in length. The clusters of male flowers are about half an inch long, very numerous, solitary, and sessile along the twigs; the females grow in very beautiful rose-coloured cones, cotemporaneous with the new foliage, and which afterwards become brown, the scales thin, blunt, and remaining erect, as in the figure (204). In one variety the stem is continued beyond the cone to the length of two or three inches. The leaves fall in autumn, so that in winter the tree is naked.

The third of the three common species, the Norway Spruce-fir, or *Abies excelsa*, is immediately distinguished by its leaves growing *singly*, and spreading equally round the twigs; also by its very long, cylindrical and pendent cones, with blunt, upright and wavy scales. When growing singly, it is one of the most charming of its tribe, the long drooping branches touching the earth, and the general shape of the tree being that of a fine pyramid.

The singularly ornamental and picturesque forms of the Coniferæ, their rapid growth, and evergreen cheerfulness, have long rendered them especial favourites for pleasure-grounds. At the delightful and romantic residence of R. H. Greg, Esq., Norcliffe, near Styal,* the botanist and lover of nature may admire a collection of upwards of forty species and varieties, the specimens for the most part fine and promising. The broken and precipitous character of the ground; the soil, which is principally a well-drained marly clay; and the aspect, are all eminently con-

* Very liberally open to the public on application by letter, either to Mr. Greg, or to his intelligent and skilful head-gardener, Mr. McLaren, to whose courtesy I am indebted, not only for the following list of names, but, along with many friends, for much pleasure and valuable information, especially respecting Conifers, on various occasions of visits to Norcliffe. (See "Manchester Walks and Wild-flowers." p. 106.)

ducive to their prosperity. The best and rarest are named in the list below, those marked with a star being more or less general elsewhere. The oldest have been planted about thirty years.

ABIETINEÆ.

* Scotch Fir—(*Pinus sylvestris.*)
* Dwarf or Mountain Pine—(*Pinus pumilio.*)

Smaller prickly-coned Pine—(*Pinus muricata* or *Edgariana.*)

* Corsican Pine—(*Pinus Laricio.*) Distinguished by its candelabrum form of growth, long tapering buds, and long and intensely green leaves.
* Black or Austrian Pine—(*Pinus Austriaca.*) Blooms freely. The nearly allied species called the Tartarian pine (*Pinus Taurica* or *Pallasiana*), though not grown at Norcliffe, is tolerably frequent elsewhere. Both species grow well in Mr. Ferris's choice and beautiful arboretum in Victoria Park, two miles and a half from the Manchester Exchange, a fact worth noting by planters of Conifers near the town.
* Cluster Pine—(*Pinus Pinaster.*) A very handsome spreading tree, with long leaves and large cones in star-like clusters. Remarkable also for its fine masses of clustered foliage, which are the more conspicuous from portions of the branches being destitute of leaves. Blooms freely.

Remarkable Pine—(*Pinus insignis.*) Leaves of an extremely rich and beautiful grass-green, and *three* in a sheath.

* Cembran Pine—(*Pinus Cembra.*) A tree of very pretty compact pyramidal mode of growth, and exceedingly hardy. The leaves grow *five* in a sheath, as do those of the next species.
* Weymouth Pine—(*Pinus Strobus.*)
* Norway Spruce Fir—(*Abies excelsa.*) Sixty feet high, and the top covered with cones, which the squirrels are glad of, and entirely strip away by the spring. (One of the finest trees of this species, near Manchester, is at Mr. Bull's, Didsbury, but not visible from the road.)
* Black Spruce Fir—(*Abies nigra.*) A splendid tree, at Quarry Bank, thirty feet high, with many pinnacles.

Warty Fir—(*Abies Menziesii.*) Leaves short and stiff, soon falling, and leaving the branches warty.

* Douglas Fir—(*Abies Douglasii.*) Very ornamental, and scents the air after rain. The leaves a deep green, like those of the yew.
* Hemlock Spruce—(*Abies Canadensis.*) Twenty-four feet high, and ripening its little cones, which are scarcely an inch long.

Clanbrasil Spruce Fir—(*Abies Clanbrasiliana.*)

Cephalonian Silver-fir—(*Picea Cephalonica.*) Six feet high.

Nordmann's Silver-fir—(*Picea Nordmanniana.*) A most beautiful tree, especially in spring.

* Pinsapo Silver-fir—(*Picea Pinsapo.*) Distinguished by the cylindrical leaves, disposed all round the twigs, and the young topmost branches radiating like a star-fish. This beautiful tree grows well at Mr. Bull's, and gives excellent promise at Mr. Ferris's.
* Larch—(*Larix Europœa.*) Several sixty feet high.

* Cedar of Lebanon—(*Cedrus Libani.*) A dark, rich, massive, and majestic tree, the branches, when allowed space, spreading horizontally, in distinct layers.
* Deodara—(*Cedrus Deodara.*) Light, airy, and graceful,—a vegetable fountain, feathered to the ground, and tapering to a point, like the larch. The Styal specimen, twenty-five feet high, is the tallest near Manchester. An exceedingly fine one may be seen in Burnage Lane, before the house lately occupied by Mr. Thomas, near the Bishop's; and another at Mrs. Mason's, Whalley Range.

Silver Cedar of Mount Atlas—(*Cedrus Atlantica.*)

* Araucaria, or Chili Pine—(*Araucaria imbricata.*) One of the most curious trees in nature; the trunk quite straight and erect, the branches in rigid, horizontal whorls of six, seven, or eight, and turning up at the ends; the leaves broadly lanceolate, pointed, and densely imbricated, and the general aspect of the tree that of a great crowd of writhing serpents, captive and seeking to free themselves. The finest Styal specimen is fourteen feet high. (The largest near Manchester is at Sir James Watts', Abney Hall, Cheadle; and the next largest at Mr. Bull's, Didsbury.)
* Wellingtonia—(*Wellingtonia gigantea.*) Several fine young trees, four to five feet high. (The tallest in this district is at North Rode, Macclesfield, measuring over seven feet.)
* Red-wood—(*Sequoia* or *Taxodium sempervirens.*)

Cupressineæ.

* Common Juniper—(*Juniperus communis*, E. B. xvi. 1100.)
* Common Savin—(*Juniperus Sabina*, and variety *prostrata.*)

Nepal Juniper—(*Juniperus recurva.*) Fragrant, and droops as if withered.

Pencil-wood Cedar—(*Juniperus Bermudiana.*)

Red Cedar—(*Juniperus Virginiána.*)

* Chinese Juniper—(*Juniperus Chinensis.*) Remarkable in having two kinds of leaves upon it.
* Oriental Arbor-vitæ—(*Biota* or *Thuja Orientális.*)

Weeping Arbor-vitæ—(*Biota péndula.*)

Yellow Arbor-vitæ—(*Biota aurea.*)

* Common or American Arbor-vitæ—(*Thuja Occidentális.*) The well-known, popular, and strongly scented evergreen. At Styal, twenty-two feet high.

Giant Thuja—(*Thuja gigantea.*) The most beautiful of the *Arbor-vitæ* group, both in colour and form. Native of California.

Ware's Thuja—(*Thuja Warcana.*)

Chilian Arbor-vitæ—(*Libocédrus Chilénsis.*)

Large Californian Cypress—(*Cupréssus macrocárpa.*)

Gowen's Cypress—(*Cupréssus Goveniána.*)

Knight's Cypress—(*Cupréssus Knightiána.*)

* Deciduous Cypress—(*Taxódium distichum.*) Twenty-eight feet high.
* Japan Cedar—(*Cryptoméria Japónica.*) The finest tree of this species, near Manchester, is in a garden by the roadside at Sale, about a hundred yards nearer town than Mr. Yates's.

A few other Conifers, not in the Styal collection, occur in gardens, such as the Balm of Gilead Fir (*Picea balsamea*); the white spruce, or *Abies alba*, and the evergreen cypress (*Cupressus sempervirens* or *fastigiata*). In green-houses there are also the richly-beautiful Norfolk Island pine, or *Araucaria excelsa*, the branches of which are horizontal at first, and afterwards pendulous, and one or two small *Cupressineæ*.

CXLVII.—THE CYCAS FAMILY. *Cycadáceæ.*

The two genera *Cycas* and *Zamia*, the former containing about five species, and the latter about seventeen, are all that are known to constitute this little but most interesting family, which in different points at once resembles ferns, coniferous trees, and palm-trees. They agree with the palms in their simple and cylindrical stems, bearing a crown of large leaves upon the summit, and, though short in the Zamias, rising in the *Cycas circinalis* to the height of thirty feet; conifers they resemble in their seeds and inflorescence, and also in the microscopical characters of the wood; and ferns they correspond with in their large and pinnate leaves, generally circinate while young, and which, when they disarticulate from the trunk, (after the manner of conifers) leave it strongly marked with the lozenge-shaped scales of their broad and woody petioles. They grow chiefly in equinoctial America and Asia, in Madagascar, and at the Cape of Good Hope.

Two species are commonly found in hot-houses, the *Zamia horrida*, and the *Cycas circinalis*. The latter is usually very small, with a conical yellowish stem about a foot high, and seven or eight inches in diameter, and a terminal and evergreen crown of thirty or forty large finely pinnatifid and fern-like leaves, each two or three feet long, the pinnules very numerous, linear, and exceedingly rigid.

CXLVIII.—THE YEW-TREE FAMILY. *Taxáceæ.*

The yew-tree, with its congeners, all of which are arborescent, is distinguished from the Coniferæ by the ovules being solitary, and unprotected by hardened scales. In other respects the two families closely agree, giving a hand on one side to the noblest exogenous plants, on the other to the noblest of the Cormogens. The stems are branched irregularly; the leaves usually small, narrow, and evergreen,

sometimes dilated and lobed, and in that case fork-veined, indicating the approach of this family to the Ferns. The species, which amount to about fifty, are widely distributed in the milder parts of the world, and are in many cases valued for their hard and beautiful timber. In England they are known only in the common yew, and in a few rare exotics. The *Cephalotaxus Fortuni* of the north of China, a magnificent tree when full grown, with large, deep-green revolute leaves, three or four inches long, and of a silvery hue on the under-surface, is grown at Norcliffe; and occasionally there may be seen a young tree of the Japanese *Salisburia*, the leaves of which resemble those of a maiden-hair fern, but are two or three inches in length and breadth.

The common yew is a dark and sombre evergreen, with a short, thick and massive trunk, and widely-spreading branches. The leaves are about an inch in length, narrow linear, entire, glossy, and with the margins somewhat revolute; they are inserted all round the twigs, but spread in two opposite ranks, with all the upper surfaces in the same plane. The flowers are diœcious, that is to say, the males and females grow on different trees, the former in little oval and yellowish clusters, sessile in the axils of the leaves, and very numerous. The females are similarly placed, and followed in autumn by crimson fruits half an inch long, and in figure resembling a little acorn, only that the cup is succulent with viscid juice, and the ovule within it considerably shorter. Sometimes the cup is small and green.

HABITATS AND LOCALITIES.

Common Yew—(*Taxus baccáta.*)

Everywhere in gardens, plantations, and churchyards, and sometimes in woods and in remote places, where it probably is wild. The oldest specimens in the neighbourhood stand in the churchyards of Lymm, Warburton and Bowdon; and one of the handsomest in the churchyard at Mobberley. At Bank Hall, near Hale, there is a row of about sixteen. A dwarf variety, called the Irish-yew, is also common in gardens. Fl. March, April.

E. B. xi. 746; Baxter, iii. 222.

The leaves of this celebrated tree are poisonous, but the fruit may be eaten with safety.

CXLIX.—THE TAMUS FAMILY. *Dioscoreáceæ.*

A small family of climbing plants, occupying an intermediate position between Exogens and Endogens, and with the exception of the common English *Tamus*, altogether tropical. The yam, or *Dioscorea sativa*, is the only important species. The roots are very large and tuberous; the leaves broad and net-veined, with distinct petioles, which are often articulated to the stem; the flowers small, trimerous, and unisexual. The only exotic species known to Manchester botany is the extraordinary hot-house plant called the "Elephant's-foot," or *Testudinária elephántipes.*

The Tamus has a large fleshy rootstock, which is white within, but externally black. From this there spring up, every year, in April and May, round, slender, and leafy stems, that twine among bushes and small trees to the length of six or eight feet or more, and often hang among them in graceful festoons, several stems twining and wreathing together, as in the honeysuckle. The leaves are alternate, of an elegant narrow heart-shape, two to four inches long, very pointed, petiolate, quite entire, glabrous, and of a bright and shining green. The flowers are small, regular, deeply six-cleft, greenish-white or yellow, and borne in very elegant, light, lax, axillary racemes, the males and females being on separate plants. The racemes of male flowers are generally longer than the leaves, and those of the females rather shorter. By autumn they are transformed into copious clusters of brilliant scarlet and viscid berries the size of a pea, and exceedingly conspicuous and ornamental among the fast-fading foliage, their own being of a fine yellow. The stems die with the winter. Stamens six; ovary inferior; styles or stigmas three.

HABITATS AND LOCALITIES.

TAMUS—(*Tamus communis.*)

Woods, thickets, cloughs and shady hedges; rather rare. Cotterill, and in all the woods thereabouts, plentiful. The same at Thelwall, below Lymm, in the lanes near the powder-mills. Woods in the Reddish Valley. Plentiful near the new church, Culcheth, near Warrington. Crookley Wood, near Stockport, but now nearly destroyed by the herbalists. A root was once got in Crookley Wood, weighing 28 lbs. (Mr. Isaac Williamson.) Fl. June, July. Berries in September and October.

E. B. ii. 91; Baxter, iv. 291.

CL.—THE TRUE-LOVE FAMILY. *Trilliaceæ.*

Intermediate, like the *Tamus* family, between Exogens and Endogens, having the netted-veined, though not articulated, leaves of the former, and the flowers and embryo of the latter, and proximately characterized by their simple and erect herbaceous stems, seldom rising more than a foot above the ground; and large, terminal, solitary and bisexual flowers. The leaves are generally whorled, and the flowers trimerous, consisting of distinct calyx and corolla, with six or nine stamens. Occasionally the flowers are tetramerous and have eight stamens. They grow in the thickets and woods of the temperate parts of the northern hemisphere, and number about thirty species, several of which, called *Trillium*, are not uncommon in good gardens. One species grows wild in England and near Manchester,—the celebrated plant commonly known by the name of "true-love," and one of the most remarkable this country produces. The stem is nine or ten inches high, perfectly simple, and naked except at the summit, where there is a whorl of four large, broadly egg-shaped, sessile and shining leaves, each about three inches in length. In the midst of them, elevated on a peduncle, rises a solitary green flower, all the parts of which are in fours. The outer segments, or sepals, are narrow, lanceolate, and about an inch long; the four inner ones, or petals, are broader, and with a yellowish cast. All eight of them spread out widely, and even recurve a little. Stamens eight, hypogynous, their filaments slender, the anthers linear and yellowish. Ovary four-celled, with as many distinct styles, and ripening into a violet-coloured berry. Sometimes there are five leaves, in which case the flower becomes pentamerous, and occasionally there are as many as six or seven, or only three or two, but in these cases, the flower, if any, remains four or five cleft. The chief portion of the stems bear leaves only.

HABITATS AND LOCALITIES.

TRUE-LOVE—(*Paris quadrifolia.*)

Damp woods, generally half-concealed among taller plants, and in other modest retreats among the trees. Cotterill Clough; Ashley; and abundant in Burley Hurst Wood, Mobberley, on both sides of the streamlet that creeps along the bottom. "Wood near Bury, and near Mellor, Derbyshire." (B. G.) Fl. June.

E. B. i. 7; Baxter, i. 6.

IMPERFECT, OR FLOWERLESS PLANTS.

Class III.—CORMOGENS.

CLI.—THE FERN FAMILY. *Filices.*

The Ferns are the *bijouterie* of nature. If flowers are rendered charming by their gaiety of colour, the ferns, while in their forms quite as varied and as graceful, are no less delicate in their tissues and organization, and no less lovely in their tender and perennial verdure. These beautiful and universally-admired plants introduce us to the *flowerless* part of vegetable nature. Everything heretofore described has been distinguished by the possession of a distinct floral or sexual apparatus,—stamens or male essentials, and ovary, or potential seed-pod, with stigma surmounting it, the apparatus being usually protected by a calyx and corolla, or equivalent bracteas;—now, on the other hand, instead of blossoms with stamens and pistil, there is scarcely ever anything more of the nature of a flower than a little cup of minute seeds, how developed and vitalized we cannot discern. Certainly, in many cases, among these "flowerless plants," there is a difference in the reproductive functions of different parts, apparently rendering those parts complementary to one another as seed-producing agents, and thus analogous to stamens and pistils. There can be no doubt, moreover, that in the scheme of vegetable life universally, there is a vigorous two-fold energy similar to that which in the more complex races is played forth by stamens and pistils; still, in the practical, every-day sense of the word, ferns, mosses, and the other families now about to be described, are *flowerless*. In no case have they anything that can be dissected away, and called calyx, corolla, stamen, or stigma. Generally speaking, the flowerless plants are humble in stature; many thousand species are microscopic, and consist only of a few cells; only a portion of them are provided with stem-like and leaf-like organs, and such as they do possess are generally of incomplete structure. The parts directly concerned in the reproduction of these plants, whatever may be their form, are collectively called the

"fructification;" while the seeds, being formed differently from those of flowering plants, and without distinct embryo and cotyledons, are termed "spores."

The Ferns hold the first rank among the flowerless plants, on account of their comparatively high organization, which in some particulars agrees with that of Exogens. They have distinct roots; frequently a large and thick rhizome or root-stock, which often lies upon the surface of the ground; and elevated from this latter, a kind of stem, bearing beautiful foliage, the thin parts of which, on being held between the eye and the light, are found to be traversed by delicate veins, though generally forked and never re-uniting, instead of interlaced, as in Exogens. (Fig. 205.) The foliage serves a twofold purpose. It corresponds at once to the *leaves* of flowering plants, and to their *twigs* and *peduncles*. Every "fern-leaf" or "fern-branch," or whatever else it may be popularly called, is, in reality, the amalgamation into a single body of what in Exogens is broken up into three or four distinct organs, and distinguished by as many different names. Botanists term it a "frond,"—a term intended to signify that it comprises within itself both stalk and leaf, peduncles, and seats of fructification. The main stalk of the frond is termed the "*rachis*." This latter part is very often clothed with light-brown scales, which seem to be in ferns what hairs and down are to other plants. The scales are even more remarkable in the rootstocks, making them resemble caterpillars and the hairy feet of the smaller quadrupeds. The rachis is in most ferns erect, or elegantly arched backwards, but sometimes, as in the *Lygodium*, it twines like a scarlet-bean.

The green and leafy portion of the frond is either quite simple, or much branched, and deeply cleft and lobed, the divisions being often doubly and triply pinnatifid. It also varies immensely in general outline, surface, and edge. In describing these conditions, it is customary to borrow the terms applied to the leaves of flowering plants. Some species are extremely prone to divide and branch in a secondary degree, ferns growing as it were upon ferns. This happens remarkably in the hart's-tongue, and very strikingly in fronds of the ostrich-feather type, the margins and tips of which are often most curiously dilated and fringed, forming beautiful crispy tassels. There are few indeed that do not at times assume the forked or "bifid" condition.

In height, the ferns generally rise to one or two feet, but there are many which are much taller, while others are only a few inches out of

the ground. In the tropics there are glorious species that attain the stature of trees, building up a slender shaft with the bases of their successively-developed fronds, which keep ascending in a crest higher and higher into the air, after the manner of the crown of a palm-tree, and emulating the palm-leaves in magnitude. A rude and rudimentary pedestal of this nature is observable in some of our native *Aspidiums*. While in the bud state, the fronds are usually "circinate," or curled inwards, every little frondlet partaking of the general curl. The spectacle they present when they rise out of the ground in spring, resembling little shaggy and clenched fists, is exceedingly curious and pretty. As they expand, they often present the figure of a bishop's crozier. When fully developed, the fronds of shield-ferns often form an elegant inverted cone, spreading from the crown of the root like the feathers

Fig. 205.
Forked veins. Leaf of Maiden-hair Fern (magnified).

Fig. 206.
Osmunda (miniature).

of a shuttle-cock. Green is the prevailing *colour* of the fronds, though a few charming species, called *Gymnogrammas*, are richly overlaid on the under surface with a golden or silvery powder, which is apt to rub off like the feather-dust from a butterfly's wing.

The *fructification* of the ferns is in the highest degree curious. Generally, it is disposed upon the under surface of the fronds, in the shape of tiny circular spangles, or of long and narrow bars, or as a beautiful continuous braid along the margin, the colour being in every case brown or yellowish. These spangles, bars, or lines, are termed the *sori*. They are chiefly abundant at the upper part of the frond, and are sometimes quite confined to it, and in some species, as the hard-fern, occupy only a few of the fronds. The fronds of a given fern-

root do not all produce sori necessarily; sterile fronds and fertile ones are almost always intermingled. The sori are in perfection about the close of summer, and last till the end of autumn, and in the evergreen species even till spring. When examined with the microscope, they are found to consist of multitudes of little spore-boxes, termed *thecæ*. Every "theca" is usually girt with an elastic ring, which seeks to straighten itself when the spores are ripe, and thus tears open the theca, and disperses them. The spores are exceedingly minute, and produced in incalculable quantities, the little spangles, like the "fairies' money" the poet has aptly likened them to, literally "turning to dust." While young, the sori are covered by a very delicate membranous lid, called the "*indusium*," which cracks or detaches itself, in the different genera, in many different ways, and furnishes excellent discriminating marks for them. Some ferns, instead of having their sori on the under surface of the frond, bear them in terminal panicles, as represented in Fig. 206, while in others they are packed into a kind of spike, and in others again protruded from the edge of the frond in the shape of little baskets or cornucopias. In these latter kinds the elastic band round the theca is generally imperfect, or altogether wanting.

The number of species of ferns is estimated at two thousand. They grow in all parts of the world, loving chiefly moist warm woods upon islands in happy climates, though some prefer the open plain, and even walls. Not a few haunt the edges of waterfalls, and shady cavernous rocks in deep dells and quiet glens, while others seat themselves on wild cliffs by the spray of the sea. It is a peculiar allurement to the study of this beautiful tribe, that their habitats are almost always of this romantic and elfin character.

The British ferns, like the grasses, are variously reckoned, different authors making them thirty-six, forty-two, and fifty, according to the value they severally attach to the distinctive characters. Forty may be taken as the likeliest number, Manchester having twenty-two of them. They form an admirable subject for the young botanist to commence with, the extent being small, specimens easily procurable, and no plants so easy of preservation for the herbarium. It is important to observe that the fructification must be examined while it is *young*. The sori are then distinct, and the indusia perfect; whereas, when mature, the former often become "confluent," or commingled at the margins, so that instead of clear outlines, we have nothing but confused and dusty patches. The indusia at the same time shrivel up, and either fall off or are concealed by the flood of thecæ.

SECTION 1.

Sori upon the underside of the frond, in the form of spangles, bars, or a continuous marginal braid. Thecæ girt by an elastic ring. Fronds circinate while young.

*

Frond quite simple, varying from three inches long and an inch broad to two feet long by two to three inches broad, heart-shaped at the base, pointed, smooth, and bright grass-green. Sori in deep brown bars, sloping from the midrib to the margin. 14. HART'S TONGUE.

**

Frond more or less divided, pinnatifid, or branched; the divisions termed "pinnules."

A.

Lower pinnules the longest, or nearly so, usually giving the leafy part of the frond a broad base, or even rendering it triangular. The leafy part, at all events, not tapering down into a point; and confined, or nearly so, to the upper part of the rachis.

Frond simply pinnatifid. Sori without indusia.

Pinnules slightly serrate, one or two inches long. Sori large, circular, and yellow. Frond oblong .... 1. COMMON POLYPODY.

Pinnules deeply cleft, the lowest pair projecting forwards. Sori small, numerous, dark-brown. Frond triangular, finely hairy ..... 2. BEECH-FERN.

Frond repeatedly subdivided.

Sori forming a continuous marginal braid. Pinnules and their divisions very numerous.

Fronds six to nine inches high, densely tufted, fine and delicate pea-green, resembling parsley .. 16. PARSLEY-FERN.

Fronds two to six feet high, and two to three feet broad, solitary, tough, and robust; brown in old age ..... 18. BRAKE-FERN.

Sori scattered over the under surface of the pinnules.

Pinnules five to ten. Sori linear. Fronds dark blueish-green, two to three inches high, densely tufted ..... 13. WALL-RUE FERN.

Pinnules and their divisions very numerous. Sori circular. Frond more or less triangular.

Frond with three distinct branches, deflexed where they spring from the rachis; six to fifteen inches high, and very brittle. Sori without indusia ..... 3. OAK-FERN.

Frond with many pairs of branches, all in one plane. One to three feet high. (Fig. B.).. 7. BROAD-LEAVED SYLVAN SHIELD-FERN.

B.

Leafy part of the frond gradually narrower to the base, frequently tapering down to a point, and usually extending the whole length of the rachis.

*

Frond simply pinnatifid, the pinnules entire, or slightly serrate, and exceedingly numerous.

Pinnules lanceolate, an inch or more long. Fronds twelve to twenty inches high, the sterile and fertile ones dissimilar ..... 17. HARD-FERN.

Pinnules oval, about a quarter of an inch long. Rachis black and shining. Fronds densely tufted ..... } 12. COMMON SPLEENWORT.

**

Frond doubly pinnatifid; the pinnules, which are very numerous, being deeply cleft into "segments," and the segments usually serrated. Eighteen inches to three feet high.

Segments, or at least those near the rachis, more or less distinctly stalked, and serrated.

Sori linear. Segments mostly with little stalks, and finely and deeply serrated. No brown scales, or scarcely any, on the rachis. Frond thin, very delicate, light green, and deciduous. (Fig. E.).. 11. LADY-FERN.

Sori circular. Lower segments crescent shaped, much larger than the others, and auricled on one side. Rachis very scaly. Fronds evergreen.

Only the lower segments stalked. Frond very rigid. (Fig. A.) ..... } 9. LUNATE SHIELD-FERN.

Segments all distinctly stalked ..... 10. PRICKLY SHIELD-FERN.

Segments all attached by a broad base. Sori circular.

Sori along the margins of the segments. (Fig. C.).... 5. SWEET MOUNTAIN-FERN.

Sori in a double row up the centre of the segments.

Segments finely serrated. Frond very large and broad. Indusia large, purple while young. (Fig. D.) ..... } 4. COMMON SHIELD-FERN.

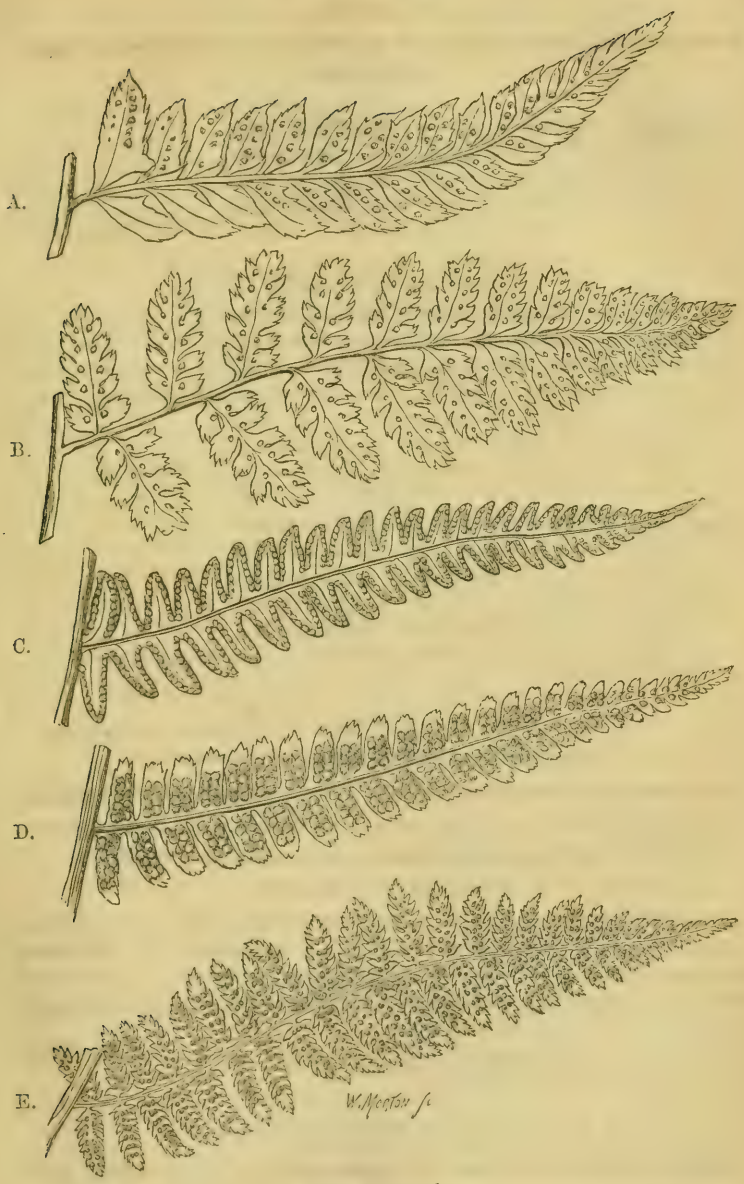
Segments quite entire ..... 6. MARSH-FERN.

***

Frond triply pinnatifid, the pinnules being very deeply cleft into "segments," and the segments again cut into "lobes."

Frond one to three feet high, ovate-lanceolate, the rachis stiff, and more or less scaly. Indusia flat and circular ..... } 8. MOORLAND SHIELD-FERN.

Frond four to six inches high, very delicate and fragile; rachis without scales. Indusia bladder-like while young ..... 16. BRITTLE-FERN.



Figs. 207—211.
Pinnules of Ferns.

SECTION 2.

Fructification not upon the under surface of the frond. Thecæ without a distinct elastic ring.

*

Fructification consisting of little cup-shaped involucres, which project from the edge of very delicate, pellucid, much-divided, and moss-like fronds, two to three inches high, and contain the theca within them ..... 19. FILMY-FERN.

**

Fructification in panicles.

Fronds three to six feet high, numerous, branched, doubly and triply pinnate, the segments an inch long, broad and flat. Panicle terminal. Many fronds without panicles. (Fig. 206) ..... 20. OSMUNDA.

Fronds solitary, three to six inches high, with crescent-shaped lobes. Panicle lateral, and resembling a little bunch of grapes. Every frond with a panicle. 21. MOONWORT.

***

Fructification in a linear and tapering spike, which consists of two rows of crowded spore-cases, imbedded in the substance of the spike, and occupying its two opposite sides. Leafy part of the frond solitary, two to six inches long, ovate-lanceolate, pointed, and entire. Spike two to four inches long. 22. ADDER'S-TONGUE.

HABITATS AND LOCALITIES.

1. COMMON POLYPODY—(*Polypódium vulgáre.*)

Dry and mossy hedgebanks; about the mossy banks of trees, and on the bosses of the trunks of aged ones in woods, like a tropical epiphyte; also on rocks, walls, and old thatched roofs, common everywhere.

Curtis, i. 68; E. B. xvi. 1149.

A beautiful little evergreen fern, the length of the fronds varying from three to fifteen inches; and the colour of the abundant circular sori, from the palest primrose to the deepest yellow. It was a brilliant golden-spangled specimen of this pretty plant, growing out of an old wall by the roadside ascending to Failand, that first attracted me to scientific botany.

Several curious varieties are grown in ferneries, especially the doubly pinnatifid form called *Polypodium Cambricum.*

2. BEECH-FERN—(*Polypodium Phegópteris.*)

Moist woods, rather rare. Abundant in Mr. Philips' woods, near the viaduct at the upper end of Mere Clough, and more or less so in

other parts of the same clough. Bredbury Wood. Dell at Marple, about a hundred yards from the bridge. (Mr. Isaac Williamson.)

E. B. xxxi. 2224.

The name "beech-fern" refers, not, as some suppose, to the fact of the plant growing especially in beech-woods, of which there is no evidence, but rather the reverse,—but to the form of the frond, after the principal portion of the stalk has been broken off. It then closely resembles the profile of a beech-tree, the lowermost branches elegantly drooping towards the ground.

3. Oak-fern—(*Polypódium Dryópteris.*)

In damp woods and cloughs, rather rare. Very plentiful and luxuriant in Burley Hurst Wood, Mobberley. Abundant in woods at Charlesworth Coombs. (Mr. Sidebotham.) Sparingly in Mere Clough. In the clough near Marple Bridge, with the *Phegopteris.* (Mr. Isaac Williamson.)

E. B. ix. 616.

The oak-fern, like the beech-fern, is so named, not from its favourite habitation being under or among oak-trees, but from the figure of the frond when laid flat. It then gives a pretty miniature outline of the oak-tree, with its wide-spreading branches, and comparatively low stature. This very charming fern is immediately distinguishable from every other by the deflexion of the branches of the frond at the point where they have their origin, forming an obtuse angle with the principal stalk.

4. Common Shield-fern—(*Aspidium* or *Lastréa Filix-mas.*)

Everywhere in woods, and on hedge and ditch-banks.

Curtis, iii. 554; E. B. xxi. 1458.

A most instructive species from which to learn the nature of the *indusium.*

5. Sweet Mountain-fern—(*Aspidium* or *Lastréa Oreópteris.*)

In woods and shady cloughs; on steep brows, where somewhat shaded, and on ditch-banks, common. Plentiful in Mere Clough, and generally in the neighbourhood of Prestwich. The same at Droylsden, Ashley, and Rostherne. Boggart Hole Clough. Stalybridge Brushes. Very abundant about Strines, Werneth Lowe, and Apethorne. (Mr. Sidebotham.)

E. B. xv. 1019 (as *Polypódium Oreópteris*).

A very elegant fern, easily recognised by the beautiful border of beads along the edges of the pinnules. (Fig. C.) Examined with the microscope, the under side of the frond is found to be thickly sprinkled with yellow glands, secreting a fragrant matter which, if the plant be drawn through the hand, is readily communicated to it.

6. Marsh-fern—(*Aspidium* or *Lastrea Thelypteris.*)

A tuft of this curious fern grows on the borders of Rostherne Mere, opposite the church. All true botanists and lovers of plants will honour it and leave it untouched. (Mr. Hunt.)

E. B. xv. 1018 (as *Polypodium Thelypteris*).

7. Broad-leaved Sylvan Shield-fern—(*Aspidium dilatátum* or *Lastrea dilatáta.*)

Everywhere in woods, groves, and cloughs.

E. B. xxi. 1461.

A large and remarkably handsome species, with broad and usually triangular fronds.

8. Moorland Shield-fern—(*Aspidium spinulósum* or *Lastrea spinulósa.*)

In damp, marshy, and heathy places, common. Abundant on Hale Moss, and on the borders of ditches near Carrington Moss. Pond-sides at Back Levenshulme, and between Gorton and Reddish.

E. B. xxi. 1460.

Distinguished from the preceding by the oval shape of its fronds.

9. Lunate Shield-fern—(*Aspidium or Polystichum lobatum.*)

Woods, and in rough, bushy places, rather uncommon. Plentiful near Marple Aqueduct. Cotterill Clough and the adjacent woods. Ashley Woods, sparingly. (Mr. Hunt.) About Strines. (Mr. Sidebotham.) In the lane by Bass Bank Aqueduct, Statham, near Lymm. (Miss Florence Brownell.)

E. B. xxii. 1563.

Remarkable for its rigidity, and for the elegant lanceolate and crescent form of the fronds.

10. Prickly Shield-fern—(*Aspidium* or *Polystichum aculeatum.*)

In similar situations, rather uncommon. Woods at the back of Marple old Hall. Cotterill Clough.

E. B. xxii. 1562 (and E. B., Supp. ii. 2776, as *Aspidium angulare*).

11. Lady-fern—(*Asplenium* or *Athyrium Filix-fœmina.*)

Everywhere in woods, groves, cloughs, and other shady places; abundant also in ditch-banks. The variety *irriguum* in woods at Bowdon and Lymm. (Mr. Hunt.)

E. B. xxi. 1459 (*A. irriguum*, E. B. xxxi. 2199).

The most delicate and tender of the larger British ferns, the young fronds being sometimes little more than a green film, yet lifting themselves into the air strengthfully, and seldom broken by the wind or rain. The exquisitely fine serratures of the pinnules (Fig. E.) and the long and narrow sori, are at all times enough to determine it.

12. Common Spleenwort—(*Asplénium Trichómanes.*)

On rocks; on old walls, and other stonework; and in the moats of ancient manor-houses and castles, from which the water has been drawn off, rather rare. Plentiful on the Wilmslow face of Barden Bridge, the first that strides the Bollin above where that river is crossed by the railway, about half a mile from Wilmslow Station. Plentiful on a wall near Mr. Arkwright's mill, Marple Bridge. (Mr. Sidebotham.) About Bramhall. (Mr. Karron.) Mobberley Mill. (Mr. Holland.) Appleton, near Warrington. (Miss F. Brownell.)

Curtis, iv. 645; E. B. viii. 576.

A very beautiful little evergreen fern, growing in dense tufts out of the crevices of the rocks and stones among which it loves to insinuate its long black roots, and conspicuous in the fine purplish-black and shining colour of its stalks, which resemble those of the maiden-hair ferns, or *Adiantums*. The little oval pinnules readily break off, especially after maturity, and leave long portions of the rachis more or less naked.

13. Wall-rue Fern—(*Asplénium Ruta-murária.*)

On old walls, not uncommon. Alderley Churchyard wall. Wilmslow. Abundant and very fine about Lyme Hall. Marple old Hall. Strines. Dunham. Wall of Rhodes Farm, Outwoods. Mobberley old Hall. Lymm Rectory wall. Washford Lane, near Warrington. (Mr. John Moss.)

E. B. iii. 150.

Distinguished immediately by its dense tufts of grayish or blueish-green fronds, often not more than an inch in height, and rarely exceeding three inches, and often with cobweds entangled among them.

14. Hart's-tongue—(*Scolopéndrium vulgáre.*)

Moist woods and cloughs, especially where warm and kindly; also on moist, shaded rocks, and in cave-like places, and the mouths of old wells; sometimes on dry and exposed walls, but then with a starved and stunted aspect. Very fine and abundant in Burley Hurst Wood, Mobberley. Abundant at Baguley Mill, in the little ravine made by the stream, and in the draw-wells thereabouts. Common between Baguley and Cotterill. Reddish. Lymm. Culcheth. Marple old

Hall. Styal Wood. Moat at Arden Hall, sparingly, and in the old coal-pit shafts on the opposite side of the river.

Curtis, i. 67 (as *Asplenium Scolopendrium*); E. B. xvi. 1150.

The most strongly marked of the British ferns; the long, broad, bright-green ribbons conspicuous at a distance, and beautifully adorned with large brown sori, proceeding slantwise from near the midrib to the margin. Being evergreen, it may be gathered in perfection in the depth of winter.

15. Brittle-fern—(*Cistopteris fragilis.*)

Rocks and old walls, but in the immediate neighbourhood of Manchester unknown. The nearest locality for the normal form of the plant is the Buxton road, beyond Whaley Bridge. The variety *dentata* is plentiful at Seal Bark, Greenfield. (J. P.) A plant of it grew till a few years back on the wall of Rostherne Church.

E. B. xxiii. 1587 (and E. B. xxiii. 1588, as *C. dentata*).

16. Parsley-fern—(*Cryptogramma crispa.*)

On the high moorlands beyond Bury and Stalybridge, among stones. Plentiful and luxuriant on Fo-edge.

E. B. xvii. 1160 (as *Pteris crispa*).

17. Hard-fern—(*Blechnum boreale.*)

Dry banks in heathy woods and cloughs, on steep and stony brows and hedgebanks, and especially on the banks of the ditches and drains on the borders of the mosses, abundant everywhere. Very luxuriant on Hale Moss, and near Lindow Common.

Curtis, i. 140 (as *Osmunda Spicant*); E. B. xvii. 1159.

The sterile and fertile fronds of this common but elegant fern are always and very strikingly distinct. The sterile ones are lanceolate and flat, tapering to a point both at the apex and the base, with the pinnules close together; the fertile ones, which occupy the centre of the tuft, are fewer and much taller, with long, slender, and generally much incurved pinnules, that are usually at some little distance apart.

18. Brake-fern—(*Pteris Aquilina.*)

In woods and cloughs, on hedgebanks and moors, in parks and waste places, everywhere, often appropriating to itself the whole surface of the ground, and forming, as in Dunham Park, a dense jungle, four or five feet high.

E. B. xxiv. 1679.

Next to the *Osmunda*, the largest and tallest of the English ferns, and near Manchester before all in respect of size. It often grows among brambles, heaths,

and other undershrubs, over which the feathery fronds bend in living arches. When the stem is pulled out of the ground, and cut through slantwise, the figure of a spread-eagle is presented, whence the name *Aquilina*. The resemblance is closer, perhaps, to the portrait of an oak-tree, with its short and massive trunk and spreading branches. The stem is angular, and rather sharp-edged when full-grown, and should be grasped tightly, or it may cut the hand. In the woods by Lymm water grows a pretty variety with the pinnules crisped.

19. Filmy-fern—(*Hymenophyllum Tunbridgense.*)

In caves at Seal Bark, Greenfield, sparingly (J. P.), the only locality near Manchester.

Curtis, iii. 558; E. B. iii. 162.

20. Osmunda—(*Osmunda regalis.*)

Chiefly on damp heaths and moors, and in the ditches bordering them; occasionally in woods and cloughs: on the north side of Manchester, sparingly; on the south and south-east, abundant. In ditches about Timperley, Carrington, and Baguley. Abundant at Knutsford; and on Peover Heath, Camersham Heath, and elsewhere about Chelford and Holmes Chapel. Barton Moss. Wood in Heaton Park. Fallowfield. (O. A. Ferris, Esq.) Fine and plentiful in the lane leading from Warburton Moss towards Dunham Station. (Mrs. Brownell.) Near Dean Moss, Newton-in-the-Willows, six feet high. (Mr. Leigh.)

Curtis, iv. 646; E. B. iii. 209.

A magnificent plant, both in its stature and the great panicles of spore-cases, resembling minute brown flowers, which surmount a large number of the fronds. Curious abnormal developments of the panicle are not uncommon. Sometimes the lower half of a branch will be leafy, and the upper half consist of spore-cases; sometimes the upper will be the leafy part, and the lower one the sporiferous; and sometimes there is a medley of the two.

21. Moonwort—(*Botrychium Lunaria.*)

Open, hilly, and heathy meadows and pastures; not uncommon on the north and north-east of Manchester. Above Ashton, Oldham, and Bury. Plentiful on Tandle Hill and in Hopwood Park, both near Middleton. Pasture above Strines Printworks. (Mr. Sidebotham.) Abundant in meadows near Reddish Mill, opposite Arden Hall. Rivington Pike and Horwich Moor. (R. H.)

Curtis, iii. 553; E. B. v. 318 (as *Osmunda Lunaria*).

22. Adder's-tongue—(*Ophioglossum vulgatum.*)

Moist meadows and pastures, common, but often concealed by the grass; also in cloughs and damp woods. Ashley Wood. Cotterill

Clough. Clayton Vale. Meadows near Jackson's Boat. Reddish, with the moonwort. Styal. Lawn at Norcliffe. (Mr. Mc.Laren.) Mobberley, abundant. (Mr. Holland.)

Curtis, iii. 552 ; E. B. ii. 108.

Two or three other ferns are considered by some to belong to the Manchester Flora, viz. :—

Asplenium Adiantum-nigrum. Once grew in a draw-well at Boothstown, and once on a wall at Eccles. (J. S.) "Stone-quarries near Winwick."

Asplenium marinum. "Hulme Stone-quarry, between Warrington and Newton."

Aspidium cristatum. On a moss at Wybunbury, near Crewe, sparingly. (Mr. Leigh.)

The rare beauty and diversity of the ferns has of late years rendered them great favourites with the amateur cultivator. A garden now seems incomplete without its fernery, and a green-house unfinished if there be not somewhere a little rockery or special corner, where the sweet brightness of their tender green shall yield a perennial pleasure. Collections of English ferns are exceedingly numerous, even within a little distance of the town. Mr. Ferris's, in Victoria Park, is in every way complete and beautiful; and the same may be said of the fernery at Wythenshawe Hall, the charming seat of T. W. Tatton, Esq. The finest displays of stove and green-house ferns are at the Belle-Vue Gardens, Mr. Yates's, at Timperley, and Mr. Hammond's, at Levenshulme,—a noble collection, comprising four hundred species. As regards curious *varieties*, in addition to a vast number of rare species, no collection within forty or fifty miles can compare with Messrs. Stansfield's at Todmorden. Their stoves and green-houses are filled with the most extraordinary ferns in nature,—forms many of them so wonderful as to make imagination true, and the plants all in the highest state of vigour. They have no less than forty-four distinct varieties of the hart's-tongue, twenty of the lady-fern, ten of the hard-fern, and eight of the common shield-fern. Among the choice exotics are the following:—

Adiantum concinnum,
" caudatum,
" curvatum,
Asplenium præmorsum *var* lacerum.
" brachypteron,
" nidus,
" caudatum,
" zamiæfolium,
Cheilanthes Alabamensis,
" frigida,
" radiata,
Drynaria coronans,
" musæfolia,
Cibotium Barometz,
Balantium Culcita,
Davallia Nova Zeylandii,
" dissecta,
" tenuifolia,
Gleichenia microphylla,
" flabellata,
Didymochlæna truncatula,
Litobrockia Karsteniana,
Lomaria Magellanica,
" Chiliensis,
Nephrolepis Davallioides,
Leucostegia chærophylla,
Nothochlæna Hookerii,
" chrysophylla,
Platyloma tenuifolia,
Polypodium areolatum.

The hardy ferns are in quite as great diversity as the stove and green-house kinds, and deserve the examination of every one interested in this lovely and insatiably varied family.

CLII.—THE LYCOPODIUM FAMILY. *Lycopodiáceæ.*

The Lycopodiums resemble the ferns in some few particulars, but are distinguished and distinctly characterized by their fructification, which is sessile in the axils of leaves or bracteas, in the latter case forming cylindrical and terminal spikes or "clubs," whence these plants are commonly miscalled "club-*mosses*." The thecæ are one to three-celled, and generally burst by valves, some of them containing a powdery substance, and others rather large granules, which appear to be the genuine spores. The stems are usually prostrate and creeping, generally much branched, and thickly clothed with minute imbricated leaves. There is a considerable difference, however, in the aspect of the species, the *Selago* and the *arboreum* presenting perhaps the two extremes. The latter is one of the delicate light-green species now such favourites in green-houses and indoor ferneries, and distinguished by its tall and scrambling stems, and fern-like foliage, blue or green according as the light falls, like a lady's shot-silk dress. About two hundred species are known, natives of much the same localities as ferns. Twenty or thirty of the exotics, commonly called *Selaginellas*, are cultivated under glass, and of indigenous species we have six, four of them occurring near Manchester.

Stems tufted and upright, though slightly decumbent at the base, the forked branches forming dense, level-topped tufts, three to six inches high. Leaves long, spreading, and crowded, Thecæ in the axils of the upper ones ..... 3. SELAGO.

Stems creeping or prostrate. Fructification in spikes.

Fruiting branches simple. Stems one to three inches long ..... 4. MARSH CLUB-MOSS.

Fruiting branches forked or clustered.

Leaves minute, closely imbricated in four rows, giving a square form to the branches. Spikes sessile, crowded into dense and level-topped clusters .. 2. ALPINE CLUB-MOSS.

Leaves long, spreading, with fine points. Spikes two, or sometimes three together, on stalks at least as long. Stems one to three feet long ..... 1. COMMON CLUB-MOSS.

HABITATS AND LOCALITIES.

1. Common Club-moss—(*Lycopodium clavatum.*)

On the high hills north and east of Manchester. Fo-edge. Kinder Scout. Greenfield. Once found in a hilly pasture at Apethorne.

E. B. iv. 224.

2. Alpine Club-moss—(*Lycopodium alpinum.*)

In the same situations. Kinder Scout; Greenfield; Fo-edge; but in the latter place for the present rather obscured, owing to the land-slip in the bank. Wood-bank Farm, Bredbury. (Mr. Isaac Williamson.)

E. B. iv. 254.

3. Selago—(*Lycopodium Selago.*)

In the same situations. Greenfield. Fo-edge.

E. B. iv. 233.

4. Marsh Club-moss—(*Lycopodium inundatum.*)

Formerly on Baguley Moor, and probably still lingering in the neighbourhood. (Margin of Oak Mere, Delamere Forest. Mr. Leigh.)

E. B. iv. 239.

CLIII.—THE PILL-WORT FAMILY. *Marsileáceæ.*

A little family of insignificant aquatics, growing in ditches and inundated places, and in England represented only in the *Isoetes* and the pill-wort. The latter occurs near Manchester. Stems long, slender, and creeping, with roots at every joint. Leaves also at the joints, linear, two to three inches long, bright green. Theeæ resembling little pills, almost sessile in the axils of the leaves, covered with short hairs, and divided into four cells, which open at the top, when ripe, into four valves.

HABITATS AND LOCALITIES.

Common Pill-wort—(*Pilulária globulifera.*)

Formerly on the edges of ponds on Baguley Moor, and probably still thereabouts. Ponds near Longford Bridge. (Mr. John Hardy.)

Curtis, iii. 560; E. B. viii. 521.

CLIV.—THE HORSETAIL FAMILY. *Equisetáceæ.*

A family consisting of a single genus of perhaps not more than ten species, but widely dispersed over the world, and almost the whole copiously represented in our own country. The stems are erect, rush-like, cylindrical, hollow, jointed, more or less deeply furrowed, generally rigid, perfectly glabrous, though often rough, and of heights varying from twelve inches to five or six feet. At every joint there is

Fig. 212.
Sylvan Horsetail.

Fig. 213.
Field Horsetail.

a membranous sheath, half an inch to an inch or more in length, enclosing the base of the internode next above it, and fringed or toothed at the upper edge. No leaves are developed, but in general abundance of long, thin, slender, and almost hair-like branches, which spread in regular whorls from the joints of the stem. The branches are sometimes a little compound, usually quite simple, and in a few cases altogether absent. When a slightly-withered stem of

the *E. Telmateia* is held upside down, so that the branches fall languidly, it is easy to see the origin of the name of these curious plants. The fructification is borne in terminal and conical spikes of a brownish or greenish-yellow colour, and varying in length from half an inch to two inches. Some species have their spikes on separate stems, which in that case are devoid of branches, and appear a month or two earlier than the branched ones. (Fig. 213.) Whether the fertile stems be of this different figure or not, both fertile and barren ones are always produced by every species (as happens with the fronds of ferns), so that every species has to be learned under two aspects. The spike consists of several whorls of little shield-form and many-angled scales standing slightly apart, so as to give it an elegantly tesselated appearance, and complete the superficial resemblance which it bears to the cone of a fir-tree. Under every scale there are six or seven little thecæ, filled with minute spores, and opening internally; the spores, which are greenish, and innumerable, dusting out readily as a fine powder. When magnified, they are found to have four little club-headed filaments attached to the base, as represented in the figure (214), the

Fig. 214.
Spore of Horsetail (greatly magnified).

latter endowed with the power of rapidly curling round the spore when moistened with the breath, and presenting a very diverting spectacle in their movements, which may be compared to those of a frightened spider.

The Horsetails have no immediate affinity with any existing family of plants. More than any other plants, unless the *Cycadaceæ*, they carry us back to the pre-Adamite ages, the organic forms of which are now only known as fossils, and even now impart a strange and primæval aspect to the scenes of their abundance, such as ordinarily we look for only in the museum of the geologist. "Memorials of a class of plants whose day is past, they seem, like the Cycadaceæ, to linger with us not so much for their own sake, as to 'make former times shake hands with latter.'"*

Nine species grow wild in England, and five of them near Manchester.

* See "Life, its Nature," &c., p.p. 246—249, Ed. 2.

Barren stems.

Stem white, with numerous long branches, three to five feet high ..... 1. Great White-stemmed Horsetail.

Stem green, one to two feet high.

Branches scarcely any. Growing in ponds ..... 4. Pond Horsetail.

Branches numerous.

Branches drooping and subdivided, so as to form cupolas round the stem. (Fig. 212) ..... 3. Sylvan Horsetail.

Branches spreading and simple, or nearly so.

Branches very few in a whorl ..... 5. Marsh Horsetail.

Branches ten or twelve. (Fig. 213) ..... 2. Field Horsetail.

Fertile stems.

No branches.

a. Growing in water, intermingled with barren stems, and forming dense forests, like rushes ..... 4. Pond Horsetail.

b. Growing in marshes or on land, and appearing and withering before the barren stems are produced.

Sheaths at least an inch long, completely covering the internodes ..... 1. Great White-stemmed Horsetail.

Sheaths less than an inch long, and far apart; large and coarse; their teeth about ten. No rudiments of green branches. (Fig. 213) 2. Field Horsetail.

c. Growing in swamps or on land. Sheaths delicate, with six to eight scarious lobes. Young green branches appearing below them, and developed before the spikes have decayed ..... 3. Sylvan Horsetail.

Stems more or less branched.

Branches pendulous, forming little cupolas round the stem. (Fig. 212) ..... 3. Sylvan Horsetail.

Branches not pendulous.

Scores of the stem and teeth of the sheaths about fifteen or twenty ..... 4. Pond Horsetail.

Scores and teeth rarely more than eight ..... 5. Marsh Horsetail.

HABITATS AND LOCALITIES.

1. Great White-stemmed Horsetail—(*Equisetum Telmateia.*)

In marshy and swampy places, where shaded by trees, common everywhere. Fertile stems in May, rather rare. Cotterill. Marple Wood. Barren ones, July—September.

E. B. xxix. 2022 (as *Equisetum fluviátile*).

The tall white stems, which are often four or five feet high, and handsome green spreading branches, are a great ornament to our wet cloughs and marshy places as autumn approaches, and, like the water-lilies, seem Indian rather than English. A spike is sometimes found upon a branched stem.

2. Field Horsetail—(*Equisétum arvénse.*)

In ploughed and waste land, on hedgebanks and by waysides, everywhere. In low, moist cornfields often a very troublesome weed. Fertile stems in April and May.

Curtis, ii. 284; E. B. xxix. 2020.

The only British species that has the barren and fertile stems invariably distinct.

3. Sylvan Horsetail—(*Equisétum sylváticum.*)

Woods, cloughs, and on shady ditch-banks, more or less on every side of Manchester, but in the greatest profusion in Mere Clough, Agecroft Woods, and in all the sylvan scenes thereabouts. Fertile stems in May and June.

E. B. xxvii. 1874.

The most beautiful of the genus. (See "Manchester Walks and Wild-flowers," page 23.)

4. Pond Horsetail—(*Equisétum limósum.*)

In ponds, reservoirs, and other standing waters, forming dense aquatic forests of tall thin stems, two or three feet high, abundant everywhere. Fruiting and sterile stems together in the summer.

E. B. xiii. 929.

5. Marsh Horsetail—(*Equisétum palustre.*)

In marshy and swampy places, common everywhere. Fertile and sterile stems (of which latter there are few) together in the summer.

E. B. xxix. 2021.

Equisetum hyemale, (Curtis, iv. 643.) is grown in a few curious gardens.

CLV.—THE MOSS FAMILY. *Musci.*

The mosses reflect from afar almost all the most beautiful phenomena of flowering-plants, yet on a scale so minute that without the microscope it is impossible to learn their history. The general forms of the larger species are easy to be observed, but the fructification is in no case to be made out accurately until magnified, as happens indeed with all the flowerless plants, and especially with the ferns, but in regard to the mosses particularly important to mention, because of their close resemblance in most other points. Very careful observa-

tion, and patient and repeated dissection of the reproductive parts, are absolutely indispensable to the young muscologist. Ordinarily the term "moss" is applied to any little plant of compact and tufted habit, to the stonecrop for example, to saxifrages, and even to lichens. Strictly, it belongs only to those pretty little green genera of Cormogens made so familiar by their abundance everywhere upon the ground and on trees and walls, and for the most part distinguished by their urn-like thecæ, elevated on long stalks as fine as hair. (Figs. 215, 216, 221.) In substance the mosses are wholly cellular; their height seldom exceeds three inches, and is generally much less; and though many species have distinct and branching stems, copiously dressed with foliage and thecæ, as in Fig. 221, a large portion consist of a simple tuft of radical leaves and a central fruit-stalk, the whole presenting the miniature figure of a tulip. In this latter case the individuals grow densely crowded together, forming bright green or yellowish silky patches, which are often ten or twelve inches in

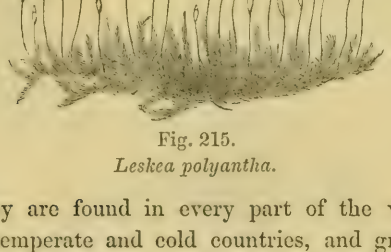


Fig. 215.
Leskea polyantha.

diameter. They are found in every part of the world, but most abundantly in temperate and cold countries, and growing in every conceivable situation. Many, such as the tall and elegant *Hypnums*, or feather-mosses, select moist and shady banks, and sequestered woods and cloughs, loving especially to sit down on the roots and stumps of aged trees; others, such as the *Tortulas*, plant themselves in luxuriant and glowing forests on the tops of walls; while the *Sphagnums*, or bog-mosses, fill vast tracts of swamp and morass, forming broad, elastic beds, pea-green in the centre, where filled with moisture, and at the edges withered and pallid, and when dry, fading almost to white. (Fig. 219.) Not a few select the margins of waterfalls, where they can be incessantly bathed with spray, and mingle their pretty foliage with that of the golden-saxifrage, and other haunters of the fountain-side; mountain rocks, especially in their chinks and crevices; half submerged stones in rivers and brooks, dry moors and heaths, road-

sides and garden walks, all have their peculiar species, some, as with other families, very rare, but the great proportion as plentiful as daisies. No period of the year finds them wholly out of bloom, though winter and spring are the times of their greatest abundance, and there are some of which the thecæ come in double harvest.

The leaves of the mosses are simple, generally oval or lanceolate, very rarely divided, and usually provided with a midrib composed of smaller and compacter cells. In some, such as the *Hookeria*, they are

Fig. 216.
Polytrichum urnigerum.

Fig. 217.
Phascum curvicollum
(magnified).

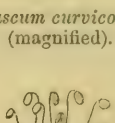


Fig. 218.
Bryum argenteum.

Fig. 219.
Sphagnum acutifolium.

pellucid. The branches of the larger kinds often present a fern-like appearance, and occasionally, as in the *Hypnum alopecurum*, spread umbrageously like the boughs of a forest-tree. The characteristic green hue is now and then saturated with gold, as in the magnificent *Hypnum splendens*, that shines with the yellow brightness of sunset; but such as grow in streams and ponds are generally of a dull and lurid hue, and the denizens of mountain rocks are sometimes almost black.

The great characteristic of the mosses is their fructification, which some observers believe to be assuredly male and female, and it is not to be denied that there is a striking semblance of sexes, if not the reality. The supposed male flowers are microscopic vesicles called "antheridia," surrounded by several rows of spreading leaves called the "perigonium." The supposed female flowers, called "archegonia," consist of slender flask-shaped bodies, surrounded by a cluster of *erect* leaves, the latter called the "perichætium." In due process of time

Fig. 220.
Theca and peristome of Moss (magnified).

Fig. 221.
Hypnum tamariscinum (Fern-moss).

after evolution one of these "archegonia" becomes a theca, which is generally elevated upon a long and slender stalk, the remainder of the "archegonia" undergoing no change, and being found, in an abortive state, attached to the base of the stalk of the perfected one. The theca is generally urn-shaped, sometimes globular, and either erect, more or less curved sideways, or quite pendulous. (Fig. 220.) While young, the incipient stalk and theca are enveloped in a thin film of cellular tissue. As the former lengthens itself, this envelope becomes

broken in the middle, the lower portion remaining at the base of the stalk, the other being carried up in the form of a conical cap, and serving to protect the theca just as the calyx protects the young corolla. The cap, technically called the "calyptra," is beautifully exemplified in the common Polytrichum, where it is covered with light-brown hairs, and hangs down with a ragged edge like Robinson Crusoe's famous goat-skin cap. On the enlargement of the theca, or at the period of ripeness, the calyptra generally splits up along one side: it is then called "dimidiate." The calyptra being removed, the theca is found to be closed at the mouth by a lid or "operculum" and an intermediate coloured ring or "annulus," composed of large cellular tissue, which by its expansion and contraction under the influence of moisture and dryness, causes the lid to fall away as soon as the theca is ripe. Then comes into view another and extremely beautiful part. This is the "peristome," a single or double row of long fine teeth, flattened at the base and tapering to a point, often of a delicate rose-colour, and marked with transverse bars. The number of teeth varies from four to eighty, but is always some multiple of four, as eight, sixteen, thirty-two, sixty-four. At first they lie flat, or nearly so, the points meeting in the centre, and thus forming a close cover to the interior of the theca. Afterwards they rise up, and often bend backwards, like the white rays of a daisy, thereby enabling the spores to escape. When damp they close again, and shut them in, presenting all the phenomena of the opening and shutting petals of a sensitive flower. In some mosses the stalk likewise is hygrometic; in others the peristome is absent; in others, called *Andræa*, the theca bursts into four equal valves, the summits of which are held together by the persistent operculum. Inside the theca is a central pillar called the "columella," around which lie the innumerable spores. Sometimes the antheridia and archegonia are on separate individuals, and the plants are then said to be dicecious. Nothing is known from actual observation of the functions of the former, but it is a well established fact that wherever they are absent, thecæ are not produced from the archegonia. Some authors consider the theca of mosses, with its various parts, as analogous to the entire blossom of a flowering plant rather than to the ripened ovary or seed-vessel, which it appears to those who consider the antheridia as analogues of stamens.

The number of known mosses is considerable, and a multitude no doubt remain undiscovered, since they grow in every part of the world. The species enumerated as natives in Wilson's "*Bryologia*" (1855)

amount to four hundred and forty-four, of which we have near Manchester two hundred and sixteen. The district is favourable to them, supplying excellent habitats in the high hills beyond Bury and Stalybridge, and in the numerous damp woods and cloughs that occur in the lowlands, Ashworth and Bamford Woods, Cotterill Clough, and Burley Hurst, near Mobberley, in particular. This part of England has long been celebrated for its muscologists. The late Edward Hobson had a European fame, at present enjoyed by Mr. Nowell of Todmorden. The *Bryologia*, the finest work on mosses ever written in the English language, comes to us, in its lustre, from Warrington. The nomenclature of the following list is adapted from this noble volume, and several species are inserted on its authority. The Greenfield, Fo-edge, Prestwich, Radcliffe, &c., localities, have been kindly supplied me by James Percival, jun.; the Disley, Marple, Charlesworth, &c., by Mr. Sidebotham; the Cotterill ones are chiefly from the manuscripts of the late George Crozier. Where no particular places of growth are specified, the species is understood to be more or less common, and to have been observed by myself. It is not necessary, in a volume of this nature, to mention *all* the known localities, even of the rarest species; and as regards the habitats of the common ones, instead of repeating the words "walls," "rocks," "banks," &c., over and over again, I consider it sufficient to denote them by an initial letter, resolving all habitats into nine general classes, as particularised below. The degree of frequency of the common species is indicated by signs prefixed to the names. It is further unnecessary, and indeed incompatible with the limits of the work, to give *descriptions* of the various species. These require to be very minute, and even if attempted, the student would still have to seek further details in works devoted expressly to the subject. Wilson's *Bryologia*, with its multitudinous coloured drawings, is inestimable, both to the proficient and to the beginner. If not at hand, there is a copy at the Chetham Library, of Hobson's "*British Mosses*," consisting of natural specimens, and very useful to consult. Popular or English *names* the mosses can hardly be said to possess; for although in books, such names are often added to the Latin ones, by translating the latter, no one ever uses them with the lips. A few generic terms, such as "bog-moss" and "feather-moss," are part of the national language, and beyond them the student will do well not to trouble himself, giving his attention exclusively to the scientific ones.

HABITATS AND LOCALITIES.

B.—Bogs, mosses, and swampy places, near pools, &c.
H.—Hedge and ditch-banks, where rather moist.
M.—Moorlands, where dry.
M.R.—Mountain rocks, especially where moist.
R.—Roadsides, garden walks, &c.
S.—Streams, rivulets, and ponds, generally attached to stones or rocks.
T.—Trees, about their roots and stumps, where shaded.
W.—Walls, rocks, and roofs.
Wds.—Woods, upon the ground.

|| Abundant everywhere.
* Common.
† Rather rare.

Andræa rupestris. M. R. Greenfield and Holcome.
E. B. xviii. 1277.

——— *Rothii.* In similar localities.
E. B. xxxi. 2162.

|| *Sphagnum cymbifolium.* B.
E. B. xx. 1405 (as *Sphagnum latifolium*).

——— *molluscum.* B. Denton.

|| ——— *acutifolium.* B.
E. B. xx. 1406 (as *Sphagnum capillifolium*).

† ——— *fimbriatum.* B.

† ——— *cuspidatum.* B.
E. B. xxx. 2092.

† ——— *contortum.* B.

* ——— *squarrosum.* B.
E. B. xxi. 1498.

† *Archidium phascoides.* H. Hyde Road.
E. B. xxx. 2107 (as *Phascum alternifolium*, which is quite a different plant).

Phascum serratum. Borders of Mere Mere. Near Dukinfield Hall.
E. B. vii. 460.

——— *cohærens.* Borders of Mere Mere.

——— *sessile*, and var. *stenophyllum.* Borders of Mere Mere.
E. B., Supp. ii. 2829.

† ——— *muticum.* H. Baguley.
E. B. xxix. 2027.

† ——— *cuspidatum.* H.
E. B. xxix. 2025.

* *Phascum nitidum.* H.
E. B. xv. 1036 (as *Phascum axillare*).

* ——— *subulatum.* H. R.
Curtis, iii. 286; E. B. xxxi. 2177.

——— *rostellatum.* Borders of Mere Mere.
E. B., Supp. ii. 2831 (as *Hymenostomum obliquum*).

Gymnostomum tenue. W. Timperley.

——— *rupestre.* On wet rocks at Simpson Clough Bridge and Coal Bank.
E. B. xxxi. 2200 (as *G. æruginosum*).

——— *squarrosum.* H. Not infrequent in Lancashire and Cheshire.

† ——— *microstomum.*
E. B. xxxi. 2215.

‖ *Weissia controversa.* H. W.
E. B. xix. 1367 (as *Grimmia controversa*).

† ——— *cirrhata.* W. T. Common about Dunham.
E. B. xx. 1420 (as *Grimmia Dicksoni*).

——— *crispula.* Hedgebanks near Rochdale.
E. B. xxxi. 2203.

Brachyodus trichodes. On rocks and stones in the rivulet at Greenfield.
E. B. xxxvi. 2563 (as *Grimmia trichodes*).

Seligeria recurvata. Sandstone rocks in Ashworth Wood. Greenfield. On blocks of stone in the river at Marple Aqueduct.
E. B. xxi. 1489 (as *Grimmia recurvata*).

† *Cynodontium Bruntoni.* M. R.
E. B. xxxv. 2509 (as *Dicranum Bruntoni*).

* *Dicranum pellucidum.* S.
E. B. xix. 1346.

† ——— *squarrosum.* Rooley Moor.
E. B. xxviii. 2004.

——— *Schreberi.* Sailor's Shore, near Ratcliffe.

——— *crispum.* Sailor's Shore.
E. B. xv. 1151.

‖ ——— *varium.* H.
E. B. xvii. 1215.

* ——— *rufescens.* H.
E. B. xvii. 1216.

† *Dicranum cerviculatum.* B.
E. P. xxiv. 1661.

——— *subulatum.* Sailor's Shore. Stalybridge Brushes.
(*D. subulatum* of E. B. xviii. 1273, is *D. varium.*)

‖ ——— *heteromallum.* H., especially where sandy.
E. B. xviii. 1272.

——— *fuscescens.* M. R. Tintwistle, common in fruit.
E. B. xxiii. 1597.

* ——— *scoparium.* H. W.
Curtis, i. 69 (as *Bryum scoparium*); E. B. v. 354.

† ——— *palustre.* B. H.
E. B. xxxii. 2260 (as *D. undulatum*).

‖ ——— *majus.* H. W., chiefly in the hilly districts.
E. B. xx. 1409.

‖ *Leucobryum glaucum.* M. Wds.
E. B. xxxi. 2166 (as *Dicranum glaucum*).

‖ *Ceratodon purpureus.* H. W.
E. B. xxxii. 2262 (as *Dicranum purpureum*).

Campylopus densus. Alderley Edge.

——— *torfaceus.* Greenfield and Fo-edge.

* ——— *flexuosus.* M. R.
E. B. xxi. 1491 (as *Dicranum flexuosum*).

Pottia cavifolia. On a wall by the canal near Disley.
E. B. xxvii. 1889 (as *Gymnostomum ovatum*).

‖ ——— *truncata.* R.
Curtis, i. 143 (as *Bryum truncatulum*); E. B. xxviii. 1975 (as *Gymnostomum truncatulum*).

——— var. *major.* On the canal bank near Atherlow.
E. B. xxviii. 1976 (as *Gymnostomum intermedium*).

† *Anacalypta lanceolata.* Turf on the top of the canal wall at Bredbury, abundant, and on the canal wall between Marple and Atherlow.
E. B. xx. 1408 (as *Grimmia lanceolata*).

† *Didymodon rubellus.* W. Heaton Park wall. Ashworth Wood.
E. B. xx. 1438 (as *Grimmia recurvirostra*).

† ——— *flexifolius.* Greenfield. Alderley Edge.
E. B. xxxv. 2493 (as *Trichostomum flexifolium*).

Trichostomum tophaceum. Very common near Warrington.
E. B. xxiii. 1598 (as *Trichostomum lineare*).

Trichostomum rigidulum. W. Bamford Wood.
E. B. xxxi. 2178.

† ——— *homomallum.* H.
E. B. xxvii. 1899 (as *Grimmia heteromalla*).

† *Tortula rigida.* Walls on the canal banks near Marple and Hatherlow.

——— *aloides.* In the same localities.
E. B. iii. 180, and E. B., Supp. ii. 2759 (both as *Tort. rigida*).

* ——— *unguiculata.* W. H.
E. B. xix. 1299 (as *Tort. mucronulata*), and E. B. xxiv. 1663 (as *Tort. humilis*).

* ——— *fallax.* W. H.
E. B. xxxi. 2179.

——— *vinealis.* Frequent in Lancashire and Cheshire. Capesthorne. Congleton.
E. B. xxxiii. 2316 (as *Tort. unguiculata*).

——— *tortuosa.* M. R. Greenfield.
E. B. xxiv. 1708.

† ——— *revoluta.* W. Near Clifton Aqueduct.
E. B. xxxiv. 2383 (as *Tort. nervosa*).

——— *Hornschuchiana.* Near Newton Viaduct.

* ——— *convoluta.* W. H. R.
E. B. xxxiv. 2382.

‖ ——— *muralis.* W.
E. B. xxix. 2033.

* ——— *subulata.* H.
Curtis, i. 211 (as *Bryum subulatum*); E. B. xvi. 1101.

* ——— *ruralis.* Walls by the canal at Marple.
E. B. xxix. 2070.

Cinclidotus fontinaloides. Rocks in the river Goyt, at Marple Aqueduct.
Curtis, iii. 567; E. B. viii. 557 (as *Trichostomum fontinaloides*).

Encalypta streptocarpa. M. R. Greenfield.
E. B. xxxi. 2163.

Hedwigia ciliata. M. R. Greenfield.
E. B. xvii. 1179 (as *Gymnostomum ciliatum*).

Schistidium apocarpum. M. R. Marple Aqueduct.
E. B. xvi. 1134 (as *Grimmia apocarpa*).

‖ *Grimmia pulvinata.* W.
Curtis, iii. 566; E. B. xxiv. 1728.

* *Grimmia Donniana.* M. R. Kinder Scout. Greenfield. Charlesworth.
E. B. xviii. 1259.

* *Racomitrium aciculare.* M. R., where wet. Stalybridge Brushes.
E. B. xxviii. 1978 (as *Dicranum aciculare*).

* ——— *fasciculare.* S., in the mountain districts, on stones and rocks. Greenfield. Stalybridge Brushes.
E. B. xxviii. 2005 (as *Trichostomum fasciculare*).

* ——— *heterostichum.* M. R.
E. B. xix. 1347 (as *Trichostomum heterostichum*).

* ——— *lanuginosum.* M. R. Greenfield. Charlesworth Coombs.
E. B. xix. 1348 (as *Trichostomum lanuginosum*).

* ——— *canescens.* Wds. Ashworth Wood. Alderley Edge.
E. B. xxxvi. 2534 (as *Trichostomum canescens*).

† *Ptychomitrium polyphyllum.* W. M. R.
E. B. xvii. 1217 (as *Dicranum polyphyllum*).

† *Orthotrichum anomalum.* W.
E. B. Supp. i. 2696.

† ——— *affine.* T. Ringway. Near Jackson's Boat.
E. B. xix. 1323.

† ——— *diaphanum.* W. and T. Dunham Park.
E. B. xix. 1324.

† ——— *leiocarpum.* T.
E. B. xxxi. 2187 (as *O. striatum*).

† ——— *pulchellum.* W. and T. Cotterill Clough. Near Marple Aqueduct.
E. B. xxv. 1787.

† ——— *crispum.* T. Plentiful in Cotterill Clough.
E. B. xiv. 996.

Zygodon Mougeotii. M. R. Fo-edge. Woodhead.

† ——— *conoideus.* T. Cotterill Clough.
E. B. xviii. 1239 (as *Mnium conoideum*).

‖ *Tetraphis pellucida.* T. and on rocks. Abundant at Alderley Edge.
Curtis, iii. 563; E. B. xv. 1020.

Tetradontium Brownianum. Rooley Moor. Alderley Edge.

Diphyscium foliosum. Greenfield.
Curtis, iii. 562; E. B. v. 329 (as *Buxbaumia foliosa*).

‖ *Atrichum undulatum.* M. Wds.
E. B. xvii. 1220 (as *Polytrichum undulatum*).

Oligotrichum Hercynicum. Rooley Moor, plentiful.
E. B. xvii. 1219 (as *Polytrichum Hercynicum*).

† *Pogonatum nanum.* H. Reddish.
Curtis, i. 141 (as *Polytrichum subrotundum*); E. B. xxiii. 1625 (as *Polytrichum nanum*).

‖ ——— *aloides.* H.
E. B. xxiii. 1614 (as *Polytrichum aloides*).

* ——— *urnigerum.* Fo-edge. Alderley Edge. Arden Hall.
E. B. xvii. 1218 (as *Polytrichum urnigerum*).

——— *alpinum.* Fo-edge. Rooley Moor.
E. B. xxvii. 1905 (as *Polytrichum alpinum*).

† *Polytrichum gracile.* M. Eaton Moss, near Macclesfield.
E. B. xxvi. 1827.

——— *formosum.* Near Cotterill Clough.
E. B. xvii. 1198 (as *Polytrichum attenuatum*).

‖ ——— *commune.* B.
E. B. xvii. 1197.

An exceedingly handsome and very abundant moss, growing everywhere in marshy and turfy places, where it forms broad green patches, the stems six to twelve inches long, erect, close together, and bearing rosettes of long, linear-lanceolate and recurved leaves.

† ——— *juniperinum.* M. Lindow Common, plentiful.
E. B. xvii. 1200.

* ——— *piliferum.* M.
E. E. xvii. 1199.

* *Aulacomnion palustre.* B. Fruits on Eaton Moss abundantly.
E. B. vi. 391 (as *Mnium palustre*).

† ——— *androgynum.* By Bass Bank Canal bridge, Lymm. Long lane, between Bowdon and Hale.
E. B. xviii. 1238 (as *Mnium androgynum*).

† *Orthodontium gracile.* Rocks on Alderley Edge, plentiful.
E. B. Supp. ii. 2835 (as *Bryum gracile*).

† *Leptobryum pyriforme.* W. Hough-end Hall. Bowdon. Abundant on flower-pots in stoves and green-houses.
E. B. vi. 389 (as *Bryum aureum*).

Bryum elongatum. M. R. Shawforth near Rochdale.
——— *crudum.* On rocks near Bolton.
E. B. xxiii. 1604.

* ——— *nutans.* M.
E. B. xviii. 1240.

† *Bryum carneum.* H. Mere Clough. Sailor's Shore.
E. B. v. 360.

* ——— *Wahlenbergii.* H.
E. B., Supp. ii. 2836 (as *Bryum albicans*), and E. B. xxii. 1527 (as *Bryum compactum*).

——— *pseudo-triquetrum.* Rooley Moor. Scoud Moor. Fo-edge.
E. B. xxxvi. 2554 (as *Bryum cubitale*).

——— *turbinatum.* Scar-wheel, Broughton.

* ——— *pallens.* H.

——— *uliginosum.* Sailor's Shore.

* ——— *cernuum.* W.

* ——— *inclinatum.* H.

* ——— *intermedium.* W.

——— *bimum.* B. Hale Moss.
E. B. xxii. 1518.

* ——— *capillare.* W. and T.
E. B. xxviii. 2007.

——— *Donianum.* Winwick Stone-quarry.

‖ ——— *cæspiticium.* W.
Curtis, i. 212; E. B. xxvii. 1904.

* ——— *atropurpureum.* W.

——— *julaceum.* Wet rocks by the Irwell, above Agecroft.
E. B. xxxii. 2270.

‖ ——— *argenteum.* W.
Curtis, i. 212; E. B. xxiii. 1602.

The beautiful silvery hue of its little cushions, though scarcely half an inch above the surface, catches the eye continually in moist weather. Thecæ late in autumn.

* ——— *roseum.* H. Wds.
E. B. xxxiv. 2395.

Mnium affine. Knutsford Moor. Hale Moss. Gerrard's Wood, near Tandle Hill.
E. B., Supp. ii. 2739 (as *Bryum affine*).

——— *rostratum.* T. Wds. Cotterill Clough.

* ——— *hornum.* H. Wds.
Curtis, i. 71; E. B. xxxii. 2271 (both as *Bryum hornum*).

One of the handsomest of our native *Musci*, and from the elegant curvature of the upper part of the theca-stalk, often called "Swan's-neck moss."

* *Mnium undulatum.* H. Wds.
Curtis, iii. 570; E. B. xxi. 1449 (both as *Bryum ligulatum*).
One of the finest species of its genus, and readily known by the large, long and narrow, and beautifully undulated leaves.

* ——— *punctatum.* Wds., by rivulets and springs.
E. B. xvii. 1183.

* ——— *subglobosum.* B. Dean Clough. (Mr. John Turner.) Swampy places at Clayton. (Mr. John Warburton.)
E. B., Supp. iii. 2907 (as *Bryum mnioides*).

Paludella squarrosa. Knutsford Moor.
E. B. Supp. ii. 2767 (as *Bryum squarrosum*).

Meesia uliginosa. Sailor's Shore.
E. B. xxii. 1517 (as *Bryum trichodes*).

‖ *Funaria hygrometrica.* H. W.
Curtis, iii. 568; E. B. v. 342.

Entosthodon Templetoni. On sandstone rocks near the Clifton Viaduct. Stockport.
Curtis, iii. 565 (as *Weissia Templetoni*); E. B. xxxvi. 2524 (as *Funaria Templetoni*).

Physcomitrium ericetorum. Moist banks at Greenfield.
E. B. xviii. 1245 (as *Gymnostomum fasciculare*).

* ——— *pyriforme.* H.
E. B. vi. 413 (as *Gymnostomum pyriforme*).

——— *sphæricum.* "Mere, Cheshire, September, 1834, the only known locality in Britain; not found in any subsequent year." Wilson.
E. B. Supp. ii. 2830 (as *Gymnostomum sphæricum*).

* *Bartramia fontana.* B.
E. B. vi. 390 (as *Bryum fontanum*).

——— *calcarea.* Hale Moss. Stalybridge Brushes.

† ——— *pomiformis.* H., where rather dry.
Curtis, iii. 569; E. B. xiv. 998.

——— *arcuata.* Stalybridge Brushes. Fo-edge. Scoud Moor.
E. B. xviii. 1237.

* *Discelium nudum.* H.
E. B. xx. 1421.

Splachnum ampullaceum. M. Unsworth Moss. Carrington.
E. B. ii. 144.

Splachnum sphæricum. Greenfield. Carrington.
E. B. xi. 785.

Tetraplodon mnioides. Greenfield. Chat Moss. Woolstone Moss.
E. B. xxiii. 1589 (as *Splachnum mnioides*).

Schistostega pennata (Golden-light cavern-moss). Under a shady rock on the north-east side of Alderley Edge. Near Worsley and Tyldesley. (J. P.)
E. B. xxxi. 2213 (as *Gymnostomum osmundaceum*).

This lovely little plant is visible only when the light falls upon it at a given angle, and generally growing in caves, paints the sides with golden-green fire, or lets them be dark and barren, according to the point from which we take our view. The most beautiful display of it is in a cave at Green's Clough, Portsmouth, near Todmorden, the greatest curiosity in that part of the country, and which, as my enthusiastic friend Tom Stansfield remarked, as he led our party thither, literally "shines like a lake of liquid gold."

Fissidens exilis. Butts Clough and near Warrington.
E. B. xix. 1368 (as *Dicranum viridulum*).

* ——— *bryoides.* H. Wds.
E. B. ix. 625 (as *Dicranum bryoides*).

——— *osmundoides.* Bogs on Scoud Moor and Fo-edge.
E. B. xxiv. 1662 (as *Dicranum osmundioides*).

† ——— *adiantoides.* Wds. Mere Clough. Bamford Wood. Ashworth Wood.
E. B. iv. 264 (as *Hypnum adiantoides*).

* ——— *taxifolius.* H.
E. B. vi. 426 (as *Hypnum taxifolium*).

Leucodon sciuroides. T. Cotterill Clough.
E. B. xxvii. 1903 (as *Pterogonium sciuroides*).

Anomodon viticulosus. T. Near Cotterill Clough.
E. B. iv. 265 (as *Hypnum viticulosum*).

Isothecium myurum. T. Cotterill Clough. Shawforth.
E. B. xxii. 1566 (as *Hypnum curvatum*).

† ——— *myosuroides.* Wds.
E. B. xxii. 1567.

† ——— *alopecurum.* Wds. Cotterill Clough, plentiful. Marple.
E. B. xvii. 1182 (as *Hypnum alopecurum*).

† *Climacium dendroides.* B. Wds. Knutsford Moor, abundant.
E. B. xxii. 1565 (as *Hypnum dendroides*).

Leskea pulvinata. Near Chorlton and Jackson's Boat.

——— *polycarpa.* T. At the roots of willow-trees near Jackson's Boat.

E. B. xxvii. 1922 (as *Hypnum inundatum*), and E. B. xviii. 1274 (as *Hypnum medium*, but not good).

* ——— *sericea.* T. H. W.

Curtis, i. 142; E. B. xxi. 1445 (both as *Hypnum sericeum*).

Hypnum nitens. Knutsford Moor.

E. B. xxiii. 1646.

——— *glareosum* (*salebrosum* of Hooker and Taylor). Cotterill Clough.

† ——— *plumosum.* Bamford Wood. Ashworth Wood. In the river Goyt, near Marple.

E. B. xxix. 2071.

——— *populeum.* Wds. Bamford Wood.

E. B. xxii. 1584 (as *H. implexum*).

* ——— *velutinum.* H. W.

E. B. xxii. 1568.

* ——— *rutabulum.* T. W. H.

E. B. xviii. 1261 (as *Hypnum crenulatum*) and E. B. xxiii. 1647 (as *H. brevirostre*).

† ——— *rivulare.* Borders of streams. Cotterill Clough.

* ——— *piliferum.*

E. B. xxii. 1516.

* ——— *prælongum.* H.

E. B. xxix. 2035.

——— *Swartzii.* Winwick Stone-quarry.

E. B. xxix. 2034.

——— *pumilum.* Winwick Stone-quarry.

E. B. Supp. iii. 2942.

* ——— *striatum.* Wds. W.

E. B. xxiii. 1648.

* ——— *ruscifolium.* S.

E. B. xviii. 1275.

* ——— *confertum.* H. T. W.

E. B. xxxiv. 2407.

† ——— *murale.* On walls near Marple, plentiful.

E. B. xv. 1038 (as *Hypnum confertum*).

——— *catenulatum.* Rooley Moor.

* *Hypnum serpens.* H. T.
E. B. xv. 1037.

* ——— *riparium.* T. S.
E. B. xxix. 2060.

——— *polygamum* β. Near Newton Viaduct.

——— *stellatum.* Walls near Marple Aqueduct.
E. B. xix. 1302.

——— *chrysophyllum.* Near Newton Viaduct.

* ——— *palustre.* S.
E. B. xxiv. 1665, and E. B. xix. 1303 (as *H. fluviatile.*)

* ——— *stramineum.* B. Stalybridge Brushes. Prestwich.
E. B. xxxiv. 2465.

* ——— *cordifolium.* Boggy edges of ponds.
E. B. xxi. 1447.

* ——— *cuspidatum.* B.
E. B. xx. 1425.

* ——— *Schreberi.* Wds.
E. B. xxiii. 1621.

* ——— *purum.* H.
Curtis, i. 210; E. B. xxiii. 1599.

——— *Blandovii.* Knutsford Moor.
E. B., Supp. ii. 2760 (as *H. laricinum*).

‖ ——— *tamariscinum* (Fern-moss). H. Wds.
Curtis, i. 72; E. B. xxi. 1494 (both as *H. proliferum*).

† ——— *splendens.* Wds., on grassy banks. Mere Clough. Cotterill Clough.
E. B. xx. 1424.

——— *brevirostre.* Bredbury Wood.
E. B., Supp. iii. 2865.

——— *flagellare.* In the valley of the Dean rivulet, near Rooley Moor. Greenfield.
E. B. xxxvi. 2565 (as *H. umbratum*).

† ——— *triquetrum.* Wds. Cotterill Clough.
E. B. xxiii. 1622.

——— *loreum.* Rooley Moor. Ashworth Wood. Alderley Edge.
E. B. xxix. 2072.

* ——— *squarrosum.* H. Wds.
E. B. xxviii. 1593.

* ——— *fluitans.* B. S. Kersal Moor. Rooley Moor.
E. B. xxi. 1448.

* *Hypnum aduncum.* B. Hale Moss.

——— *Kneiffii.* Swamp near Newton Viaduct.

* ——— *filicinum.* B. and wet rocks.
E. B. xxii. 1570.

——— *commutatum.* B. in woods. Mere Clough.
E. B. xxii. 1569.

——— *uncinatum.* Rocks by the Irwell, near Clifton Aqueduct.
E. B. xxiii. 1600.

——— *Crista Castrensis.* On the moors near Whitworth.
E. B. xxx. 2108.

† ——— *molluscum.* Hale Moss. Cotterill Clough. Woodhouse Lane, near Rochdale. Scoud Moor, abundant.
E. B. xix. 1327.

* ——— *cupressiforme.* T.
E. B. xxvi. 1860.

——— *pratense.* Near Newton Viaduct.

——— *scorpioides.* Hale Moss.
E. B. xv. 1039.

* ——— *undulatum.* Wds. Dingle at Compstall Bridge. Alderley Edge, plentiful.
E. B. xvii. 1181.

——— *sylvaticum.* T., in woods.
E. B., Supp. iii. 2936.

* ——— *denticulatum.* Wds.
(E. B. xviii. 1260 is the mountain variety).

——— *elegans*, var. *β. collinum.* Alderley Edge. Hill Cliff, near Warrington.

* *Omalia trichomanoides.* T.
E. B. xxi. 1493 (as *Hypnum trichomanoides*).

Neckera complanata. T. Cotterill Clough.
E. B. xxi. 1492 (as *Hypnum complanatum*).

——— *crispa.* Ashworth Wood.
E. B. ix. 617 (as *Hypnum crispum*).

——— *pumila.* T. Cotterill Clough.
E. B. xxi. 1443.

Hookeria lucens. Mere Clough. Marple Woods.
E. B. xxvii. 1902.

* *Fontinalis antipyretica.* S.
E. B. v. 359.

† *Fontinalis squamosa.* In mountain streams. Stalybridge Brushes, plentiful. Rocks in the river at Marple.
E. B. xxvi. 1861.

CLVI.—THE MARCHANTIA FAMILY. *Marchantiaceæ* or *Hepaticæ.*

Minute green or purplish plants, frequently with much the aspect of mosses, but distinguished from them by their thecæ opening into four or about eight valves, and the frequent presence of very beautiful spiral chains among the spores. The structure, as with the mosses, requires the microscope to be understood. They grow in wet ground,

Fig. 222.
Jungermannia tomentella.

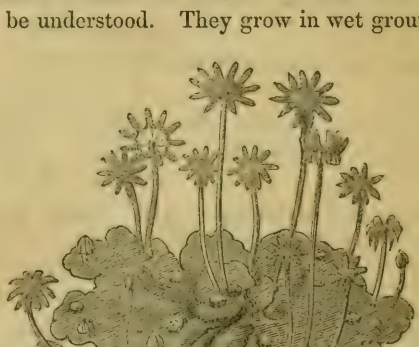


Fig. 223.
Marchantia polymorpha.

where shaded, near rivulets, on moist banks, among moss in woods and cloughs, and upon trees, often upon rocks, where they are exposed to incessant dropping of water, and especially in mountainous or sub-alpine districts. They have a distinct axis of growth, and are usually provided with distinct and symmetrical leaves, but sometimes both stem and leaves are fused into a frond, as in that very common but interesting plant the liver-wort, or *Marchantia polymorpha*, which covers the ground everywhere near springs, and the stones and rocks by waterfalls, with a close, bright-green, crystalline skin, the ends of the fronds lobed, like an oak-leaf, and the margins a little raised. The Marchantia is remarkable alike for the abundance of its gemmæ or buds, vegetating even while upon the parent, and for the great size of its

beautiful thecæ, which rise an inch above the frond, and resemble a little parasol, or tiny green mushroom, in due course splitting into rays. (Fig. 223.) The theca of the *Marchantia conica* resembles a little cap, elevated on the summit of a very long transparent white peduncle. The fructification of both species is rather uncommon. The best specimens I have seen of the *conica* have been at Burley Hurst and Cotterill; and the best of the *polymorpha*, in the neighbourhood of Old Trafford. I have also had excellent ones from the Reddish Valley, through the kindness and quicksightedness of Miss Christiana Middleton. The theca of the *Jungermannias* bursts at the apex into four valves, and resembles a little cross-shaped flower, exquisitely beautiful in the microscope. Like that of the *Marchantias* it is elevated on a peduncle, which circumstance distinguishes both genera from the *Riccia*, the spherical thecæ of which do not emerge from the frond.

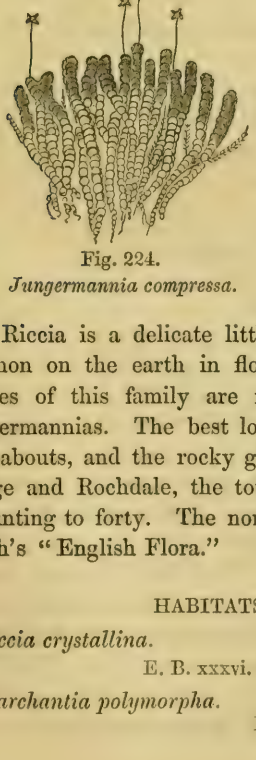


Fig. 224.
Jungermannia compressa.

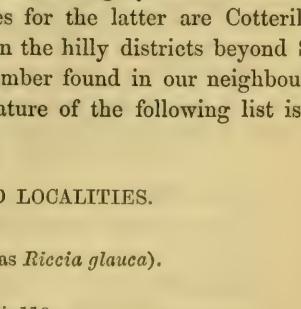


Fig. 225.
Jungermannia bidentata.

The Riccia is a delicate little plant, growing in circular tufts, and common on the earth in flowerpots in green-houses. The native species of this family are ninety-three, eighty-one of them being Jungermannias. The best localities for the latter are Cotterill and thereabouts, and the rocky glens in the hilly districts beyond Stalybridge and Rochdale, the total number found in our neighbourhood amounting to forty. The nomenclature of the following list is after Smith's "English Flora."

HABITATS AND LOCALITIES.

* *Riccia crystallina.*

E. B. xxxvi. 2546 (as *Riccia glauca*).

‖ *Marchantia polymorpha.*

E. B. iii. 110.

* *Marchantia conica.*
E. B. vii. 504.

——— *hemisphærica.*

Anthoceros punctatus. Near Jackson's Boat. (Mr. Nowell.)

* *Jungermannia asplenioides.* Cotterill Clough. Burley Hurst.
E. B. xxv. 1788.

——— *spinulosa* (and *β. tridentata*). Mere Clough. Cotterill Clough.
E. B. xxxi. 2228.

——— *pumila.*
E. B. xxxi. 2230.

——— *Sphagni.*
E. B. xxxv. 2470.

* ——— *crenulata.* Boggart-hole Clough. (Mr. Nowell.)
E. B. xxi. 1463.

* ——— *sphærocarpa.*

——— *compressa.* (Fig. 224.)
E. B. xxxvi. 2587.

——— *emarginata.*
E. B. xv. 1022.

† ——— *inflata.* Todmorden. (Mr. Nowell.)
E. B. xxxv. 2515.

——— *affinis.* Cotterill Clough.
E. B., Supp. ii. 2744 (as *J. turbinata*).

‖ ——— *bicuspidata.*
E. B. xxxii. 2239.

——— *byssacea.*
E. B. xxxv. 2463 (as *J. divaricata*).

——— *incisa.* Todmorden. (Mr. Nowell.)
E. B. xxxvi. 2528.

——— *pusilla.*
E. B. xv. 1175.

‖ ——— *nemorosa*, and var. *purpurascens.*
E. B. ix. 607, and E. B. iv. 243 (as *J. resupinata*).

‖ ——— *undulata.*
E. B. xxxii. 2251. (The fructified specimens appear to belong to *J. scalaris.*)

‖ ——— *albicans.*
E. B. xxxii. 2240, and E. B. xv. 1023 (the left hand figure).

Jungermannia complanata. T., especially oaks.
Curtis, ii. 287; E. B. xxxv. 2499.

——— *anomala.* Todmorden. (Mr. Nowell.)
E. B. xxxv. 2518.

——— *Taylori.* Todmorden. (Mr. Nowell.)
E. B., Supp. ii. 2691.

* ——— *scalaris.*
E. B. ix. 605 (as *J. lanceolata*).

* ——— *polyanthos.*
E. B. xxxv. 2479.

* ——— *Trichomanis.*
E. B. xxvii. 1875.

* ——— *bidentata.* (Fig. 225.)
E. B. ix. 606, and E. B. iv. 281 (as *J. bicuspidata*).

* ——— *barbata.*
E. B. xxxv. 2517 (as *J. quinquedentata*).

——— *setacea.* Todmorden. (Mr. Nowell.)
E. B. xxxv. 2482.

——— *ciliaris.* Todmorden. (Mr. Nowell.)
E. B. xxxvii. 2214.

——— *tomentella.* (Fig. 222.) Cotterill Clough.
E. B. xxxii. 2242.

——— *serpyllifolia.* T. Todmorden. (Mr. Nowell.)
E. B. xxxvi. 2537.

——— *minutissima.* T. Cotterill Clough.
E. B. xxiii. 1633.

* ——— *dilatata.* T. Cotterill Clough, upon ash-trees.
E. B. xvi. 1086 (as *J. tamariscifolia*).

——— *multifida.* Todmorden. (Mr. Nowell.)
E. B. iii. 186.

* ——— *Blasia.* "At the breaking of Medlock river-bank, at Feasington Wood, between Garratt Hall and Knott Mill, *about a mile from Manchester.*" (Withering's Botany, 1801.)
E. B. xix. 1328 (as *Blasia pusilla*).

‖ ——— *epiphylla.*
E. B. xi. 771.

* ——— *furcata.*
E. B. xxiii. 1632.

Class IV.—THALLOGENS.

CLVII.—THE LICHEN FAMILY. *Lichenes.*

Lichens are plants composed entirely of cellular tissue, wrought either into crisp and fringy tufts; or into wiry branches resembling locks of coarse grey hair, uncombed and dishevelled; or into thin flat, dry, crustaceous or granulated plates, which spread horizontally, and often resemble the withered leaves of trees. Some species are

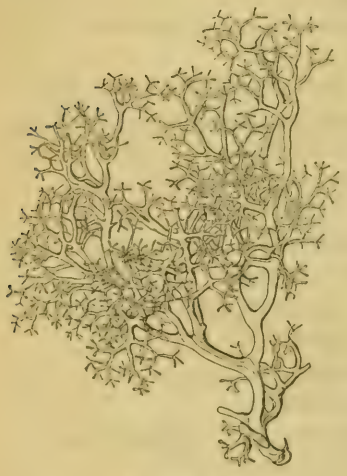


Fig. 226.
Cladonia rangiferina (enlarged).

Fig. 227.
Stereocaulon paschale.

little more than minute tubercles, and not a few are microscopic. The largest, after the hair-like kinds, which often hang from the branches of trees to a length of several feet, rarely exceed four or five inches in height or breadth, and when of such diameter, they are generally of inconsiderable thickness. With a solitary exception, none live either in water or upon decaying matter, where they give way to Algæ and Fungi; they select, on the contrary, the most airy and unsheltered situations, stern alpine solitudes, desolate cliffs by the sea, bleak mountains, and wild and breezy moors. None grow in meadows and

pastures, and a very few only mingle with the wild-flowers and grasses on the hedge-banks. Their favourite habitats are rocks and stones, many kinds seating themselves on the old monuments in rustic churchyards, and on the ruined walls of castles and abbeys, where their beautiful patches of grey or yellow incrustation mingle "time-stains" with the ivy. Many species cling to the bark of trees, especially such as are aged and decrepid, clothing them as if with a permanent hoar-frost, or with rough and shaggy beards, that in winter make them look tattered and spectral. These latter are the species commonly called "tree-moss," often so elegantly alluded to by the poets, as in the opening lines of "Evangeline." They grow in every part of the world, braving the inclemencies of every climate, and ascending to a higher level above the sea than any other plants; and, independent of seasons,

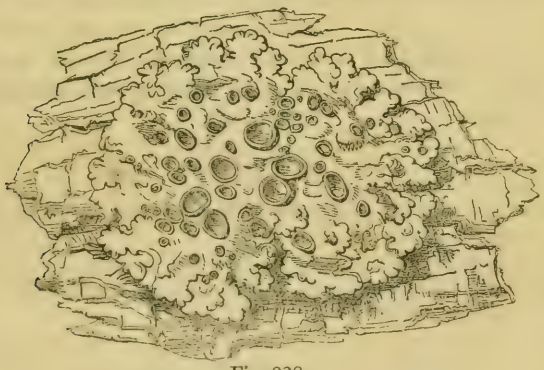


Fig. 228.
Parmelia pulverulenta (on a piece of bark).

when other plants are denuded, or gone to decay, (the mosses, the fungi, and a few evergreen trees alone excepted) their diversified hues and crowds of pretty cups "make glad the solitary place." In figure they are often singularly beautiful. A very common hedgerow species, called "fairies' wine-cups," consists of tiny gray goblets; another, equally common, growing on heaths, shoots up in silvery sprays among the moss, like a little shrub; others resemble tiny pillars, with scarlet capitals. The "letter-lichens," constituting the genera *Graphis* and *Opegrapha*, and inhabiting the smooth bark of trees, resemble inscriptions in Arabic or Hebrew. Coming upon them in the depths of the "unfrequented woods," we might almost fancy their pretty writing the literature of the Dryads,—pastorals telling the pleasures of rural life.

The main body or substance of a lichen is termed the "thallus." It corresponds at once to the root, the stem, and the foliage of a flowering-plant, all three parts being here fused into one. In colour it is usually gray, brown, whitish, or yellow. Green scarcely ever occurs, a circumstance furnishing a ready means of distinguishing lichens from *mosses*, with which they are frequently confounded, the latter being almost invariably green, as well as provided with distinct leaves. The thallus appears to be universally perennial, and nothing is more remarkable in the family than the slow growth and the longevity of individuals. In their most simple form, Lichens often appear as a mere powdery or scurfy coating, various in colour, and resembling white, green, or yellow washes. These abnormal or undeveloped states, which are exceedingly common, were until lately believed to be genuine species, and collected into genera called *Isidium*, *Leprária*, and *Variolária*. In its perfect or mature condition, the thallus is of two principal kinds, horizontal and simple, and vertical (or pendulous) and branched, each of these again presenting several modifications, viz.:—

A.—*Thallus horizontal.*

1. Crustaceous.
   Tartareous, or thick, dense, and hard, growing chiefly on weather-beaten rocks.
   Leprose, forming scaly expansions, and found on rocks and trees.
   Pulverulent, consisting of a mere powdery scurf, and growing chiefly on wood and bark.
2. Foliaceous. These comprehend the flattened and leaf-like species, often spreading in wide patches, and brightly coloured, and growing chiefly upon the bark of trees or on the ground. They are either—
   Membranous,
   Leathery, or
   Cartilaginous.

B.—*Thallus vertical.*

In this division come the thread and hair-like lichens, and those which resemble little shrubs. They are either—

3. Shrubby, or
4. Filamentous.

The fructification commonly resembles minute saucers, for the most part sessile on the surface of the thallus, and technically called "apothecia." They are generally circular and open, the spores lying in the interior like the fruit in an open tartlet. Some species produce their apothecia regularly every season, and in great abundance; others

very sparingly and infrequently. The structure of the apothecia is only to be learned with the aid of a microscope. It is indispensable to the determination of the genera, though the species may be discriminated independently of it. Here, nevertheless, as in the case of the mosses, and for the same reason, I do not attempt to give descriptive characters, or to do anything more than enumerate the species occurring in our neighbourhood, amounting, as nearly as I can ascertain, to seventy-three, or about a fifth of the entire number indigenous to Great Britain, which, according to Smith's English Flora, is four hundred. The comparative fewness of the Manchester species is referable to the flatness of our surface. Many pretty species are to be found on the moors, and in the neighbouring woods and cloughs, and in parks and old orchards in Cheshire; but the majority

Fig. 229.
Opegrapha (Letter-lichen), on a piece of bark.

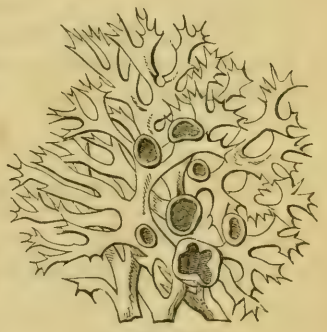


Fig. 230.
Physcia ciliaris.

of those enumerated are not obtainable nearer than on the high hills beyond Disley, Ramsbottom, Stalybridge, and Rochdale, and even there the quantity has been much lessened of late years, through the cutting down of old woods, and the influx of factory smoke, which appears to be singularly prejudicial to these lovers of pure atmosphere. Notwithstanding their dry nature and airy habitats, the Lichens are fond of moisture, and on the commencement of rainy weather often spring up like new creations. It is at such times, and in winter, when their adhesion is somewhat relaxed, that the rock-loving species are best procurable. At other seasons, chained like Prometheus, they can seldom be brought away except upon fragments of the stone on which they grow.

The *uses* of Lichens are chiefly as yielding dyes and colouring matters, some of the most vivid and beautiful of which are obtained from these humble and inconspicuous plants. Litmus, orchil, and cudbear are the chief. In a few cases, they are mucilaginous and medicinal, as happens with the "Iceland moss," or *Cetraria Islandica.*

The nomenclature of the following list is nearly that of Dr. Lindsay's excellent little manual, the "Popular History of British Lichens." Where the names differ from those of the "English Flora," the latter are cited as synonymes, and marked *Sm.* The habitats are indicated by initial letters as with the mosses.

Before entering on the study of the Lichens, the beginner should look over the drawings in "English Botany."

HABITATS AND LOCALITIES.

H.—Hedge and ditch-banks.
M.—Moorlands, especially in the mountainous districts.
M. R.—Mountain rocks.
T.—Trees, especially firs.
W.—Walls, rocks, and roofs.

Usnea florida. T.
E. B. xiii. 872 (as *Lichen floridus*).

——— *plicata.* T.
E. B. iv. 257 (as *Lichen plicatus*).

Alectoria jubata. T., especially firs.
E. B. xxvii. 1880 (as *Lichen jubatus*).

Cornicularia aculeata. M.
E. B. vii. 452 (as *Lichen hispidus*).

——— *lanata.* M.
E. B. xii. 846 (as *Lichen lanatus*).

Ramalina farinacea. T.
E. B. xiii. 889 (as *Lichen farinaceus*).

——— *fraxinea.* T., especially ashes.
E. B. xxv. 1781 (as *Lichen fraxineus*).

——— *fastigiata.* T.
E. B. xiii. 890 (as *Lichen fastigiatus*).

Physcia (*Borrera*, Sm.) *ciliaris.* (Fig. 230.) T. M. R.
E. B. xix. 1352 (as *Lichen ciliaris*).

——— (*Evernia*, Sm.) *prunastri.* T. M. The thallus is quite white, and underneath hairy or cottony, by which, along with its softness, it is distinguished from every other British lichen.
E. B. xii. 859 (as *Lichen prunastri*).

Cetraria glauca. M.

E. B. xxiii. 1606 (as *Lichen glaucus*).

Peltidea canina. H., among moss and grass, common. A large, brownish-grey lichen, easily known by its great shield-shaped apothecia, resembling finger-nails, and the white and prettily-netted under surface, from which descend a kind of rootlets.

E. B. xxxii. 2299 (as *Lichen caninus*).

——— *rufescens.* H.

E. B. xxxii. 2300 (as *Lichen rufescens*).

Umbilicaria (*Gyrophora*, Sm.) *polyphylla.* M. R.

E. B. xviii. 1282 (as *Lichen polyphyllus*).

——— *erosa.* M. R. Distinguished by the curious lace-work of its circumference.

E. B. xxix. 2066 (as *Gyrophora erosa*).

Sticta pulmonaria. T. Principally upon oaks, clothing them with a curiously pitted and reticulated green vesture.

E. B. viii. 572 (as *Lichen pulmonarius*).

Parmelia aleurites. T. Also on rails, posts, &c., chiefly in mountainous districts.

E. B. xii. 858 (as *Lichen aleurites*).

——— *perlata.* Similar localities.

E. B. v. 341 (as *Lichen perlatus*).

——— *caperata.* Similar localities.

E. B. x. 654 (as *Lichen caperatus*).

——— *pulverulenta.* (Fig. 228.) T. W.

E. B. xxix. 2063 (as *Lichen pulverulentus*).

——— *stellaris.* T. W.

E. B. xxiv. 1697 (as *Lichen stellaris*, but coloured green instead of silver-gray).

——— *ceratophylla* (*physódes*, Sm.) T. W. Conspicuous from its whiteness, and elegantly divided and curled figure. Apothecia very rare.

E. B. ii. 126 (as *Lichen physodes*).

——— *saxatilis.* M. R. T. W.

E. B. ix. 603 (as *Lichen saxatilis*).

——— *omphalodes.* M. M. R.

E. B. ix. 604 (as *Lichen omphalodes*).

——— *conspersa.* M. M. R.

E. B. xxx. 2097 (as *Lichen conspersus*).

——— *olivacea.* T., W., park palings, &c.

E. B. xxxi. 2180 (as *Lichen olivaceus*).

Parmelia parietina. Everywhere on stems of bushes, especially old thorns in hedges, covering them with a yellow crust. Also in circular and irregular patches on walls. It is most brilliant when exposed to the sunshine, becoming, under the influence of shade, more lax and leafy, and greener.

E. B. iii. 194 (as *Lichen parietinus*).

Lecanora murorum (*squamaria*, Sm.) W.

E. B. xxx. 2157 (as *Lichen murorum*).

——— *atra.* W., T., and tombs in churchyards.

E. B. xiv. 949 (as *Lichen ater*).

——— *subfusca.* T. W.

E. B. xxx. 2109 (as *Lichen subfuscus*).

——— *pallescens.* T. W.

E. B. xi. 727 (as *Lichen Perellus*).

——— *tartarea.* M. R., M., on branches of heath.

E. B. iii. 156 (as *Lichen tartareus*).

——— *varia.* T., also on old posts and palings.

E. B. xxiv. 1666 (as *Lichen varius*).

——— *albella.* T. (smooth-barked.)

E. B. xxx. 2154 (as *Lichen albellus*).

——— *Hæmatomma.* W. Thallus gray; apothecia blood-red.

E. B. vii. 486 (as *Lichen Hæmatomma*).

——— *ventosa.* M. R.

E. B. xiii. 906 (as *Lichen ventosus*).

Urceolaria scruposa. On rocks, stones, towers, old tombs in churchyards, &c., incrusting them with a hard, thick, gray crustaceous thallus.

E. B. iv. 266 (as *Lichen scruposus*).

Placodium canescens. T., especially hawthorn, and occasionally upon rocks, very common. Apothecia very rare.

E. B. ix. 582 (as *Lichen canescens*).

Lecidea geographica. M. R. Known by its extremely thin, greenish-yellow thallus, hardly separable from the rock, and confluent, so as to appear divided into compartments by black lines, and resemble the tracings on a map.

E. B. iv. 245 (as *Lichen geographicus*).

——— *Œderi.* W.

E. B. xvi. 1117 (as *Lichen Œderi*).

——— *confluens.* W.

E. B. xxviii. 1964 (as *Lichen confluens*).

Lecidea punctata (*parasema*, Sm.) T. (smooth-barked), W.
E. B. xxi. 1450 (as *Lichen parasemus*).

——— *sanguinária*. M. R.
E. B. iii. 155 (as *Lichen sanguinarius*).

——— *sphæroides* (*incana*, Sm.) T. W.
E. B. xxiv. 1683 (as *Lichen incanus*).

——— *æruginosa* (*icmadóphila*, Sm.) Turfy places, under the shade of heath, common, forming large white or greenish patches, very conspicuous and beautiful in damp weather.
E. B. vi. 372 (as *Lichen ericetorum*).

——— *ferruginea*. On sandstone and other rocks.
E. B. xxiii. 1650 (as *Lichen ferrugineus*).

——— *aurantiaca*. T., especially willow and poplar; also on rocks and stones.
E. B. xix. 1305 (as *Lichen salicinus*).
When moist, it smells strongly of saffron.

Opégrapha saxatilis. W. (sandstone). Remarkable for its chalky whiteness, and the intense black of the sporiferous clefts.
E. B. xxv. 1790 (as *Opégrapha calcárea*).

——— *varia*. Ash-trees.
E. B. xxvii. 1890 (as *Opégrapha nótha*).

——— *atra*. T.
E. B. xxv. 1753 (as *Opégrapha denigrata*).

——— *vulgata*. T.
E. B. xxvi. 1811.

Graphis scripta. T., especially hazles.
E. B. xxvi. 1813 (as *Opégrapha scripta*).

Lecanactis lyncea (*Opegrapha*, Sm.) Oak-trees.
E. B. xii. 809 (as *Lichen lynceus*).

Arthonia astroidea. T.
E. B. xxvi. 1847 (as *Opégrapha astroidea*).

Spilóma decólorans. W.
E. B. xxxiv. 2399.

Calicium tympanéllum. On old palings, and the tops of posts, growing transversely to the wood, not uncommon; sometimes on the bark of trees.
E. B. xii. 810 (as *Lichen inquinans*).

——— *clavéllum*. On boarded buildings, common.
E. B. xxi. 1465 (as *Lichen clavéllus*).

Calicium nigrum (*C. curtum* and *C. sphærocephalum*, Sm.) On the bark of old trees, and in their hollow trunks, common.

E. B. vi. 414 (as *Lichen spærocephalus*), and E. B. xxxv. 2503 (as *Calicium curtum*).

———— *débile.* On old timber.

E. B. xxxv. 2462 (as *Lichen debilis*).

Stereocáulon paschále. (Fig. 227.) M. R.

E. B. iv. 282 (as *Lichen paschális*).

One of the most elegant of the British lichens.

Bæomyces róseus. M.

E. B. vi. 374 (as *Lichen Bæomyces*).

Cladonia exténsa (*Scyphóphorus coccíferus*, Sm.) M. A charming little plant, the cups, which at first are scarcely hollowed, edged with beautiful scarlet tubercles.

E. B. xxix. 2051 (as *Lichen coccíferus*).

———— (*Scyphóphorus*, Sm.) *pyxídata.* Everywhere on dry hedge-banks and moors, conspicuous in its little mealy gray funnels half an inch to an inch high, and resembling wine-glasses, scolloped at the edges, and often bearing smaller ones upon their rims. Popularly called "cup-moss," and "Fairies' wine-cups."

E. B. xx. 1393 (as *Lichen pyxidátus*).

———— (*Scyphóphorus*, Sm.) *grácilis.* M.

E. B. xviii. 1284 (as *Lichen grácilis*).

———— *stellata* (*Cenomyce unciális*, Sm.) M.

E. B. iii. 174 (as *Lichen unciális*).

———— *rangiferína.* Everywhere on moors, heaths, and mountains, one to three inches high, often mingling its little white branches with the green foliage of mosses. The extremities of the branchlets are usually turned downwards. Commonly called "Reindeer moss." (Fig. 226.)

E. B. iii. 173 (as *Lichen rangiferínus*).

Sphæróphoron coralloídes. M. R. M.

E. B. ii. 115 (as *Lichen globíferus*).

———— *compréssum.* M. R.

E. B. ii. 114 (as *Lichen frágilis*).

Pertusária communis. T. W.

E. B. x. 677 (as *Lichen pertúsus*).

———— *fállax.* T., especially oaks.

E. B. xxv. 1731 (as *Lichen hymenius*).

Verrucária nítida. T., especially ashes.
E. B., Supp. i. 2607 (Fig. 1).

——— *gemmata.* T., chiefly young oaks.
E. B., Supp. i. 2617 (Fig. 2).

——— *nigréscens.* W.
E. B. xxi. 1499.

CLVIII.—THE CHARA FAMILY. *Charáceæ.*

Insignificant aquatics, consisting of jointed stems composed of parallel tubes, which are either transparent or encrusted with carbonate of lime, and of regular whorls of symmetrical branches of similar structure. Sometimes the tubes are solitary. They live wholly submerged, growing principally in stagnant water, are very brittle, and often unpleasantly scented. The fructification is developed in the axils of the upper whorls of branchlets, and consists of minute globules of two different kinds, the precise nature of which is not yet understood. Sixteen species are reputed indigenous, four of them being found near Manchester.

Stem and branches composed of a series of simple bright-green and transparent tubes.
Stems one or two feet long, rather rigid ..... 1. Transparent Chara.
Stems six to twelve inches long, very flexible ..... 2. Slender Chara.
Stem and branches composed of a central tube, surrounded by a series of smaller and similar tubes, arranged spirally, and the whole more or less incrusted with carbonate of lime.
Upper part of the plant beset with tufts of long-pointed tubercles. Stems one to two feet long, branched, and completely incrusted..... 4. Prickly Chara.
No such tubercles. Stems six to nine inches long, little branched, and never quite incrusted. Very fœtid.. } 3. Common Fœtid Chara.

HABITATS AND LOCALITIES.

1. Transparent Chara—(*Nitella translucens*).

Ditches and pools in peaty soil, rather rare. About Baguley. Ponds near Barlow Moor. Abundant in a pit near Burford Lane, Lymm. (Mr. John Moss.)

E. B. xxvi. 1855 (as *Chara translucens*).

2. Slender Chara—(*Nitella flexilis*).

Stagnant waters, rather rare. Ponds near White Moss. Ponds at Baguley. Chorlton fields. (Mr. Sidebotham.)

E. B. xv. 1070.

Probably not distinct from the preceding.

3. Common Fœtid Chara—(*Chara vulgáris*).

Muddy stagnant ditches and pools, common. Pond near Dunham Hall. (Mr. Knight.) Pond at the foot of Prestwich Dells.

E. B. v. 336.

4. Prickly Chara—(*Chara hispida*).

In pools and clay-pits, not uncommon.

E. B. vii. 463.

Probably only a variety of the preceding.

Withering mentions *Chara tomentosa* as growing in "peat ditches in Lancashire." The whole family needs the investigation of Manchester botanists.

CLIX.—THE MUSHROOM FAMILY. *Fungi.*

The Fungi, like the Lichens, are composed wholly of cellular tissue, but instead of being for the most part dry, and leafy or filamentous, their substance is usually sponge-like or pulpy. Objects, with most people, of prejudice and disgust (the mushroom, and two or three other eatable species alone excepted), they are plants often of remarkable beauty, and in their structure and functions in the economy of nature worthy our most attentive consideration. At first sight, it is true, there is little that can be called attractive in a toadstool, a puff-ball, or a tuft of mildew, but a short acquaintance soon places the family in a very different light, and renders it scarcely less interesting than flowers. In their simplest form the Fungi consist only of minute articulated filaments, as in the case of the mildew plants. The maximum is in those splendid round, richly-painted tables and cones, elevated on pillars of ivory, called Agarics, and which in autumn so beautifully embellish our woods and fields. The grotesque yet elegant shapes and the brilliant hues of the Fungi are almost beyond recounting. Some are fashioned like Chinese parasols; some are concave, and resemble vases and goblets; others present broad, circular, convex or flattened shields, several inches across, and often with a beautiful dimple in the centre, and in colour, of a uniform fine red, yellow, or purple, or in

some cases of the purest pearly white, the surface either of shining and satiny smoothness, or flecked with brown scales, or studded with dark bosses. The most usual colours are white and yellow; brown and red are very frequent; blue is exceedingly rare, and pure green altogether unknown. The reason of this would seem to be that the Fungi, instead of taking carbon From the atmosphere, like other plants, absorb oxygen from it, the green colour of plants in general resulting from their performance of the opposite process. Besides the table-form species, there are many of an irregular and lumpy figure. Others consist of strata of thin plates, while the puff-balls are almost or quite spherical, and solid. In duration they vary greatly. Many spring up in the course of a night, and dissolve next day, or at least with the first shower of rain; some are so delicate that they tremble in the hand when gathered, and, as in the *Agaricus radiatus*, even melt away if breathed upon; others, growing upon old trees, are perennial and almost as hard as wood. Such is the case with that beautiful and extraordinary production, the *Boletus lucidus*, a plant found in all parts of the world, and attaining great perfection in New Brunswick, whence I have many noble specimens. It consists of a broad, nearly circular plate, five or six inches or more in diameter, by an inch in thickness, in substance corky, the under surface light tan-colour and minutely porous, the upper one, like the short lateral stem, of a fine reddish-brown, smooth and shining as if lacquered, and marked with broad concentric zones, like a shell. The *habitats* of the Fungi are as various as their forms and colours. Open fields and meadows, woods, among the moss and crimp brown leaves of the former season, dead sticks and stumps, and decaying organic matter of every conceivable kind, are inhabited by the different species, it being the peculiar characteristic of the Fungi to seat themselves on dead or decomposing animal and vegetable substances, which they largely assist to remove from view, decking them, meanwhile, with a strange and anomalous beauty, "decay's effacing fingers" adorned as it were with jewels. A very few only take up their residence on living and healthy organisms, and these are all of the minute and often microscopic kind called "Blights." Every plant seems subject to the attack of some kind of little parasitic fungus, the effect being at times exceedingly destructive. It would appear, however, that atmospheric contingencies are needful to their development in *quantities*; otherwise they would be permanent and universal pests, whereas in general they are found only on individuals and uncertainly. The appearance of this class of Fungi is that of

minute whitish, brown, or orange-coloured dots or blotches, which on being magnified, resolve into elegant filamentous tufts or clusters of tubercles. They are frequently generated beneath the skin of the plant, bursting through it, when ready, like an eruption. Not only are the Fungi inhabitants of the open air; many kinds grow in cellars, caverns, railway tunnels, and other dark places, often spreading over the walls as a circular patch of velvety and coloured film, and in the case of the smaller kinds, often growing sideways or downwards,—a direction never taken by any other kind of plants, except when too slender to stand erect. Whatever their habitat, and whether large or small, it would seem that their growth is immediately checked by the intro-

Fig. 231.
Agaricus muscarius.

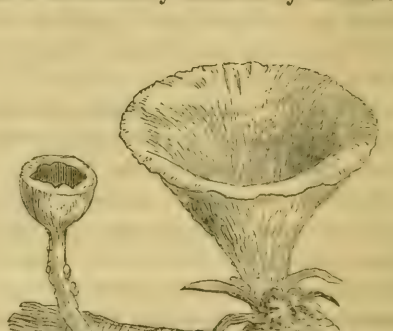


Fig. 232.
Crimson Dryad's cup (*Peziza coccinea*).

duction of some kind of perfume. Many species of the family are violently poisonous; in some the odour is delicious; others have a smell absolutely intolerable. The poisonous species are with difficulty told from the edible, rendering it very unwise to meddle with any except the common mushroom. If the odour be ammoniacal, and the taste pungent, they are probably poisonous, and the same if the colour be any shade of green, black, or purple, especially if the fungus be mature, and growing in a damp and shady place.

The fructification of these curious plants is exceedingly simple. In the Agarics, represented in the common mushroom, it lies in the "hymenium,"—that beautiful set of thin vertical plates, often with shorter ones in the interstices, which radiates from the summit of the

stalk, and is rendered visible only by inverting the fungus. The spores are exceedingly numerous, and extremely minute, but they do not appear to be independent reproductive bodies, many frequently concurring to originate a new individual. It is quite impossible here to give an account of its various developments, which must be learnt from books especially devoted to the Fungi. The same as to their generic and specific differences, the latter of which are difficult to describe in words. Many fine volumes of coloured drawings of Fungi are in existence, but in Manchester we are rather ill-provided with them. Bolton's "History of the Funguses growing about Halifax" in four quarto volumes, of which there are copies both at the Camp-field and at the Chetham Free Libraries, is the only work within reach worth consulting. A few species are figured in Curtis, which should by no means be overlooked.

The number of British species described by Rev. M. J. Berkeley in Smith's "English Flora" (vol. 5, 1836) is 1487, including both the Agarics and the microscopic parasites, but there are unquestionably very many omitted. I have not yet given proper attention to the family, and have noted near Manchester only the following one hundred and seventeen. There are probably quite five hundred more,—a fine field for the scrutiny of rising botanists. All are more or less common in their localities, and generally speaking, to be found in the autumn, few appearing before August, and the greater part as the leaves are falling from the trees. Many of the smaller species are in perfection in mid-winter and early spring. Special *localities* can but seldom be given, as the Fungi are very uncertain plants, plentiful in a given spot one year, and then not seen again there perhaps for several years. The best hunting-grounds in our neighbourhood are Alderley, Dunham Park, and the valley of the Bollin, all the way from Lymm to Styal. The "pileus" is the circular cap that constitutes the most conspicuous portion of the Agaric.

HABITATS AND LOCALITIES.

P.—Pastures, waysides, among grass, and often in gardens.

W.—Woods and plantations, on the ground, especially under fir-trees.

S.—Stumps of trees, upon their felled trunks, and on dead sticks and branches, where moist and shaded.

Agaricus phalloides. W.

Curtis, ii. 364 (as *Agaricus verrucosus*, right hand figure); Bolton, ii. 48 (as *Agaricus vernalis*).

White in every part, and very poisonous.

Agaricus muscarius. W. Alderley.

Bolton, ii. 46 (as *Agaricus nobilis*).

A splendid fungus, the pileus three to six inches across, convex, usually of a rich orange scarlet, sometimes whitish or yellowish, and the surface beset with angular warts. Unhappily very poisonous.

——— *rubescens.* W.

Curtis, ii. 364 (as *A. verrucosus*, the middle and left hand figures.)

——— *procerus.* W. Styal, in abundance and great perfection under the large Norway spruce-fir near the river, August 20th, 1859.

Curtis, ii. 288; Bolton, i. 23 (as *A. annulatus*).

Remarkably handsome; tall and whitish, the pileus broken up into sub-reflexed scales, and resembling thatch.

——— *melleus.* S.

Bolton, iv. 141.

——— *multiformis.* W. (fir.)

——— *personatus.* P.

Bolton, iv. 147.

——— *emeticus.* W.

Bolton, i. 1 (as *A. integer*).

——— *adustus.* W.

——— *deliciosus.* W.

Bolton, i. 9.

——— *quietus.* W.

——— *vellereus.* W.

——— *infundibuliformis.* W. P.

——— *virgineus.* P.

——— *conicus.* P.

Curtis, ii. 361 (as *A. aurantius*).

——— *coccineus.* P.

——— *laccatus.* W.

Bolton, ii. 64 (as *A. farinaceus.*)

——— *velutipes.* S. Hough End Clough.

Curtis, ii. 289.

——— *maculatus.* W. (fir.)

Curtis, ii. 363 (as *A. carnosus*).

——— *dryophilus.* W., especially among fallen oak-leaves.

——— *oreades.* P. Near Beeston Castle.

——— *ramealis.* S. Hough End Clough.

——— *galericulatus.* S.

——— *purus.* W.

Agaricus Fibula. Among moss, a common and pretty little fungus, of a yellowish orange colour, the stalk scarcely more than an inch high, with a pileus half an inch broad.

——— *cyathiformis.* P.
Bolton, ii. 59 (as *A. sordidus*).

——— *ostreatus.* S. Very fine near Ashton-upon-Mersey.
Curtis, i. 145.

——— *palmatus.* S. Newton Heath.

——— *stypticus.* S.
Bolton, ii. 72, Fig. 1 (as *A. betulinus*).

——— *prunulus* (The Mouceron). P. Mobberley. (Mr. Holland.)

——— *squarrosus.* S.
Curtis, ii. 290 (as *A. floccosus*).

——— *rimosus.* W.

——— *geophyllus.* W. Easily distinguished by the disagreeable odour of its pretty satiny and usually lilac pileus, scarcely an inch broad.

——— *furfuraceus.* S.

——— *melinoides.* P.

——— *involutus.* W. Hough End Clough.
Bolton, ii. 55 (as *A. adscendens*).

——— *variabilis.* S.

——— *Georgii.* P., often near haystacks.

——— *campestris* (the common mushroom). P.
Bolton, ii. 45.

——— *præcox.* P.
Bolton, ii. 67, Fig. 1 (as *A. durus*).

——— *semiglobatus.* P.
Curtis, i. 145 (as *A. glutinosus*).

——— *æruginosus.* P. W. Dunham Park.
Curtis, ii. 362.

——— *fascicularis.* S. Hough End Clough.
Bolton, i. 29.

——— *semiovatus.* On foul substances.
Bolton, ii. 53 (as *A. ciliaris*).

——— *fimiputris.* Similar habitats.

——— *disseminatus.* On the ground, above buried wood or old stumps, especially of willows, yellowish, an inch high, and growing in tufts of hundreds together.

Agaricus comatus. P.
Curtis, i. 145 (as *A. fimetarius*).

——— *atramentarius.* P. S.
Curtis, i. 144.

——— *cinereus.* On foul substances, and in fat meadows.
Bolton, i. 20 (as *A. pullatus*).

Grows in the space of a night, and dissolves the next day, the stem seven or eight inches high and silvery white, the pileus black, and plaited like a fan.

——— *niveus.* Similar situations.

——— *plicatilis.* P.
Curtis, i. 145.

——— *stercorarius.* On dunghills.

——— *ephemerus.* Similar situations.

——— *radiatus.* W. Hough End Clough.
Bolton, i. 39 (Fig. C).

Cantharellus aurantiacus. W. (fir.)

——— *cibarius.* (The Chantarelle.) W.
Bolton, ii. 62 (as *Agaricus Cantharellus*).
Concave, but rudely lobed and curled, and of a fine golden yellow.

Merulius corium. On timber, half-decayed sticks, &c.

——— *lachrymans.* The too-well known "Dry-rot" plant.
Bolton, iv. 167 (Fig. 1).

——— *pulverulentus.* On moist walls, in-doors, forming orbicular, zoned, velvety patches, often several feet in diameter, and in substance dry and tender.

Dædalea biennis. S., near the ground, especially where trees have been felled.

——— *quercina.* S., chiefly of oak.

——— *unicolor.* S.

The Dædaleas are the Fungi so familiar in their beautiful horizontal layers, often richly zoned, wavy at the edge, velvety on the upper surface, and growing in general many close one above another on old stumps and gate-posts.

Polyporus squamosus. S., especially of ash-trees.
Curtis, iii. 580 (as *Boletus squamosus*).

——— *suaveolens.* S. (of willows.) Hough End Clough.
Bolton, iv. 162 (as *B. suberosus*).

——— *salicinus.* On willows, &c.

——— *versicolor.* S. Hough End Clough.
Bolton, ii. 81 (as *Boletus versicolor*).

Polyporus igniarius. T.

Bolton, ii. 80 (as *Boletus igniarius*).

Boletus luteus. W. Abundant at Alderley.

Bolton, ii. 84.

Thelephora tabacina. S. (of hazel.) Hough End Clough.

Bolton, iv. 174 (as *Helvella Nicotiana*).

In perfection in February and soon perishes.

——— *hirsuta.* S. Hough End Clough.

——— *sanguinolenta.* S. Hough End Clough.

——— *cærulea.* S. Hough End Clough.

Clavaria pratensis. W. P. Prestwich.

Bolton, iii. 114 (as *C. muscoides*).

Readily distinguished from all other Fungi by its branching tufts of yellowish clubs, three or four inches high.

Calocera cornea. S. Hough End Clough.

Morchella esculenta (The Morel). Cotterill Clough, sparingly; and on the left bank of the Irwell, below Clifton Aqueduct. (J. P.)

Bolton, ii. 91 (as *Phallus esculentus*).

Peziza coccinea (Crimson Dryad's-cup). On dead sticks near rivulets, in woods and cloughs early in spring. A truly beautiful fungus, consisting of a cup an inch or more deep and broad, and inside of the richest carmine colour. Burley Hurst Wood, Mobberley.

Bolton, iii. 104.

——— *stercorea.* P., on cows' refuse. Dingy scarlet.

——— *virginea.* S. Pure white.

——— *fusca.* S. Hough End Clough.

Spermoedia clavus (Common Ergot). On *Glyceria fluitans* in Mere Clough; *Lolium perenne* at Hough End, &c.

Phallus impudicus. W. Common.

Curtis, i. 217; Bolton, ii. 92.

Distinguished from every other fungus by its large, thick, white horn-like stem, six or seven inches high, conical honey-combed pileus, and hideously fœtid smell.

——— *caninus.* W. Prestwich.

Curtis, ii. 292.

Nidularia campanulata. On sticks in damp woods. Hough End Clough.

Bolton, iii. 102 (as *Peziza lentifera*).

The size of a large pea, and resembling a tiny bird's-nest with eggs in it.

Sphæria hypoxylon. S. Hough End Clough.

Bolton, iii. 129 (as *S. digitata*).

Sphæria multiformis. S., especially birch. Hough End Clough.

——— *stigma.* S.

——— *graminis.* On living leaves of grass.

——— *Bombarda.* S. Hough End Clough.

——— *Lirella.* On dry stems of meadow-sweet. Hough End Clough.

——— *acuta.* On nettles.

——— *herbarum.* Stems of herbaceous plants.

Rhytisma Acerinum. On leaves of the sycamore, causing numerous large black stains.

Leptostroma filicinum. On dead stems of *Pteris Aquilina.* Hough End Clough.

Lycoperdon giganteum (Giant Puff-ball). P., rather rare. Bedford (August, 1859). Near Leigh.

——— *Proteus* (Common Puff-ball). P.

Bolton, iii. 117 (as *Lycoperdon Bovista*).

Trichia turbinata. S. Hough End Clough.

Bolton, iii. 94, Fig. 3 (as *Clathrus turbinatus*).

Erysiphe communis. Parasitic on herbaceous plants, everywhere.

Mucor mucedo (Common Mildew). On fruit, paste, preserves, &c., everywhere.

Bolton, iii. 132 (Fig. 1).

Cladosporium herbarum. On all kinds of decaying substances, forming soft, dense, dark-green tufts, blackish when old, the commonest of Fungi.

Aspergillus candidus. Similar situations.

——— *glaucus* (Common blue Mildew). On old cheese, &c.

Botrytis parasitica. On stems of cruciferous plants.

Penicillium crustaceum. Everywhere on decaying organic substances.

Tubercularia vulgaris. On decayed branches and sticks, appearing as small red tubercles, common everywhere.

Puccinia graminis. On grasses and cereals.

——— *Betonicæ.* On Betony, a fine species, frequently covering the whole of the under-side of the leaves.

——— *Anemones.* On *Anemone nemorosa.*

——— *Saxifragarum.* On *Adoxa moschatellina.*

Æcidium Ranunculacearum. On leaves of *Ficaria verna*, often covering them with bright orange.

Uredo Segetum (Common Smut). On the ears of wheat, barley, and oats, very common and destructive, turning the whole to a black powder.

Uredo Rhinanthaceæarum. On *Rhinanthus* and *Euphrasia.*
——— *compransor.* On leaves of coltsfoot and sowthistle.
——— *Ruborum.* On bramble leaves.
——— *candida.* On *Capsella*, forming oval white blotches.

CLX.—THE SEA-WEED FAMILY. *Algæ.*

Judging from its English name, the Sea-weed family would be thought to consist only of marine plants, in which case we should here have no concern with it. But there are innumerable species of Algæ found in *fresh* water, and some are purely terrestrial, occurring upon damp ground, and on walls exposed to frequent wet. Of these latter kinds, commonly called *Confervæ*, there are plenty near Manchester. Few botanists care, however, to attend to them, nor until 1844 were steps taken in this neighbourhood to ascertain the species and their localities. In that year Mr. Sidebotham commenced the investigation, and during the next four or five summers, Mr. Williamson (now Professor at Owens College), Mr. Thomas Gray, the late amiable John Ashworth, and myself coöperating, those enumerated at foot were determined. Now that a "Manchester Microscopical Society" has been established, it is to be hoped that this interesting branch of botany will receive renewed attention, and that acceptance of the fine opportunities it affords for the elucidation of important physiological facts, as well as for delight of the eye, will shew that the members are in earnest. A great deal remains to be done, and the field is alike accessible and rewarding.

The marine Algæ comprise a great variety of forms, from the black and leathery tangles, with their curious bladders, that mantle the cliffs, and are stranded in fragments by the retiring waves on the sands of every coast, down to those exquisitely delicate and pellucid rose-coloured species that might be called the ferns and mosses of the sea. The fresh-water species are equally diversified, but none attain such great dimensions. Many of them are only chains of cells or vesicles, of the most beautiful and lucid greens in nature, and a large portion consist of no more than a single cell. The chains are frequently as fine as hair, but clustered in such vast numbers as to fill the water with a kind of vegetable cloud. The simplest kinds, called *Desmidieæ* and *Diatomaceæ*, comprise forms so wonderful that when magnified we almost mistrust our eyes. This is not the place to enter

into a detailed account of them, or of any other portion of the family. It must suffice to say that the Manchester species are almost wholly aquatic, inhabiting ponds, ditches, streams open to the sun, and the bosoms of gloomy fountains, some preferring to live in stagnant water, others in the purest and clearest. The student who would wish to learn something of them should consult Hassall's "*British Fresh-water Algæ*," 2 vols., 8vo, the second consisting of coloured drawings; Smith's "*British Diatomaceæ*," and Ralfs' "*Desmidieæ*," also very copiously illustrated. The greater part of the Manchester species and localities were originally published in the last-named work. Mr. Notcutt's "*Hand-book of the Microscope and Microscopical Objects*," pp. 62 and 132, contains some very useful directions how to find and examine these beautiful and inconceivable little plants.

The three great families of THALLOGENS, the Lichens, the Fungi, and the Algæ, each take us to the very lowest point of vegetable structure. Perfectly distinct in their larger forms, it is difficult to draw up any positive and absolute differential characters by which they shall at all times be discriminated one from the other; the easiest and safest, as a general rule, lie perhaps in their habitats and mode of sustenance, and may be tabulated as follows:—

Growing in water, ALGÆ...		Nourishment drawn from the medium in which they live.
Growing in air,	LICHENS.	
	FUNGI...	Nourishment derived from the dead or decaying organic matter on which they are seated.

LIST OF SPECIES.

1. CONFERVACEÆ.

Vaucheria dichotoma.

E. B. xiii. 932 (as *Conferva dichotoma*).

——— *Dillwynii.*

——— *sessilis.*

E. B. xxv. 1765.

——— *geminata.*

E. B. xxv. 1766.

Lemania fluviatilis.

E. B. xxv. 1763 (as *Conferva fluviatilis*).

Batrachospermum moniliforme. Abundant in the neighbourhood of Whitworth, near Rochdale. (Mr. Tom Stansfield.)

E. B. x. 680 (as *Conferva gelatinosa*).

Batrachospermum vagum.

Draparnaldia glomerata.

E. B. xxv. 1740 (as *Conferva mutabilis*).

——— *plumosa.*

E. B. xxx. 2087 (as *Conferva lubrica*).

——— *tenuis.*

Chætophora endiviæfolia.

E. B. xiv. 967 (as *Ulva incrassata*).

——— *tuberculosa.*

E. B. xxxiv. 2366 (as *Rivularia tuberculosa*).

——— *elegans.*

Zygnema nitidum.

E. B. xxii. 1656 (in part, as *Conferva spiralis*).

——— *quininum.*

——— *commune.*

Tyndaridea stagnalis.

Mougeotia genuflexa. Everywhere in ditches, forming vast yellowish-green masses.

E. B. xxvii. 1914 (as *Conferva genuflexa*).

Staurocarpus gracilis.

Vesiculifera æqualis.

——— *Rothii.*

Bulbochæte setigera.

Cladophora glomerata. Attached to stones and piles in streams, and often extending to two feet long.

E. B. xxxi. 2192 (as *Conferva glomerata*).

Coleochæte scutata.

Lyngbya muralis. On the ground and on walls, forming a green stratum of indefinite extent, very conspicuous after a shower of rain.

E. B. xxi. 1554 (as *Conferva muralis*).

——— *floccosa.*

Tolypothrix distorta.

E. B. xxxv. 2577 (as *Conferva distorta*).

Oscillatoria tenuis.

——— *turfosa.*

——— *nigra.*

Microcoleus repens.

E. B. xxviii. 1995 (as *Conferva vaginata*).

Rivularia viridis.

Trichormus incurvus.

Nostoc commune.

E. B. vii. 461 (as *Tremella Nostoc*).

Ulva bullosa.

E. B. xxxiii. 2320.

——— *crispa.*

E. B., Supp. ii. 2754.

Enteromorpha intestinalis.

E. B., Supp. ii. 2756.

Botrydum granulatum.

E. B. v. 324 (as *Tremella granulata*).

Coccochloris protuberans.

E. B. xxxvi. 2583 (as *Ulva protuberans*).

Hæmatococcus. Several undetermined species.

2. Byssoideæ.

Byssus aurea. On rocks and trees, forming orange or brick-red cushions. Derbyshire.

E. B. iii. 212.

Hygrocrocis atramenti. On the surface of ink.

3. Desmidieæ.

Hyalotheca dissiliens.
——— *mucosa.*
Didymoprium Grevilii.
——— *Borreri.*
Desmidium Swartzii.
Sphærozosma vertebratum.
——— *excavatum.*
Micrasterias rotata.
——— *Crux Melitensis.*
Euastrum oblongum.
——— *ansatum.*
——— *pectinatum.*
——— *elegans.*
Cosmarium pyramidatum.
——— *crenatum.*
——— *botrytis.*
——— *margaritiferum.*
——— *ornatum.*
Cosmarium moniliforme.
——— *Cucurbita.*
Xanthidium fasciculatum.
Arthrodesmus convergens.
Staurastrum dejectum.
——— *cuspidatum.*
——— *muticum.*
——— *hirsutum.*
——— *tricorne.*
——— *polymorphum.*
——— *gracile.*
Didymocladon furcigerus.
Tetmemorus granulatus.
Penium Digitus.
——— *Brebissonii.*
Closterium lunula.
——— *acerosum.*
——— *turgidum.*

Closterium moniliferum.
——— *Leibleinii.*
——— *Dianæ.*
——— *striolatum.*
——— *juncidum.*
——— *lineatum.*
——— *Ralfsii.*
——— *rostratum.*
——— *acutum.*
Ankistrodesmus falcatus.
Pediastrum Tetras.
Pediastrum Heptactis.
——— *biradiatum.*
——— *pertusum.*
——— *Napoleonis.*
——— *Boryanum.*
——— *ellipticum.*
Scenedesmus quadricauda.
——— *dimorphus.*
——— *obliquus.*
——— *obtusus.*

4. Diatomaceæ.

Meloseira varians.
Achnanthes minutissima.
Tabellaria fenestrata.
Diatoma vulgare.
——— *elongatum.*
Fragillaria pectinalis.
——— *hyemalis.*
——— *Rhabdosoma.*
Eunotia arcus.
Meridion circulare.
Gomphonema truncatum.
——— *acuminatum.*
——— *dichotomum.*
Gomphonema minutissimum.
Cocconema lanceolatum.
——— *cymbiforme.*
Navicula phœnicenteron.
——— *platystoma.*
Exilaria capitata.
——— *ulna.*
——— *fasciculata.*
——— *lunaris.*
Gyrosigma hippocampa.
Sphinctocystis librilis.
Frustulia viridis.
Surirella biseriata.

APPENDIX.

LIST OF COMMON, STRIKING, AND INTERESTING PLANTS FOUND AT SOUTHPORT, BLACKPOOL, AND ELSEWHERE ON THE COAST OF LANCASHIRE, AND AT NEW BRIGHTON.

Several species are included which are also found near Manchester, but sparingly and ill-developed. To distinguish them, they are marked †, those belonging purely to the sea-side being marked *.

The principal part of the plants occurring near Manchester and upon the neighbouring coasts are common to both districts. With the addition of this appendix, the "Flora" serves accordingly for either. The names of a few other Southport species, either of great rarity, or attractive only to the experienced botanist, will be found in the complete list of the Southport plants introduced into Dr. Nicholl's useful and meritorious little "Hand-book," and again in the "Flora of Liverpool" (including Waterloo, Formby, Crosby, Bootle, Southport, and New Brighton), in the "Proceedings of the Liverpool Literary and Philosophical Society, vols. 2 and 3, 1851 and 1855, the flowering plants by Dr. Dickinson, the mosses and Hepaticæ by Mr. Marrat.

II.—THE BUTTERCUP FAMILY. *Ranunculaceæ.*

COMMON LARKSPUR—(*Delphinium Consólida.*)

Stem two feet high, branched; leaves sessile, three to five-lobed, the lobes cut to the base into linear segments. Flowers in erect racemes, irregular, spurred, deep-blue. Fl. June, July. Annual. Cornfields at Southport. (E. B. xxvi. 1839.)

V.—THE POPPY FAMILY. *Papaveráceæ.*

† Scarlet Corn-poppy—(*Papaver Rhœas.* Flora, 96.)

† Opium Poppy—(*Papaver somniferum.* Flora, p. 96.)

Both species at Southport.

VIII.—THE GERANIUM FAMILY. *Geraniaceæ.*

† Common Heron's-bill—(*Erodium cicutárium.* Flora, p. 103.)

† Musky Heron's-bill—(*Erodium moschátum.* Flora, p. 103.)

* Sea-side Heron's-bill—(*Erodium maritimum.*)

Leaves ovate, undivided, more or less toothed. Stems procumbent, hairy. Flowers minute, pale red. Peduncles seldom longer than the leaves. Fl. May—September. *Hab.* on the sands. (E. B. ix. 646.)

Crimson Crane's-bill—*Geránium sanguíneum.* Flora, p. 104.)

Fleetwood. New Brighton.

IX.—THE FLAX FAMILY. *Linaceæ.*

† All-seed—(*Radiola millegrána.* Flora, p. 105.)

Abundant at Southport.

XV.—THE CABBAGE FAMILY. *Cruciferæ.*

* Scurvy-grass—(*Cochlearia officinalis.*)

Stems much branched, three to twelve inches high. Root leaves egg-shaped, entire or toothed, and petiolate. Stem leaves lanceolate and often sessile. Flowers white, in short racemes. Seed-pods globular or ovate. Fl. May, June. Annual. *Hab.* muddy places. (E. B. viii. 551, viii. 552, and x. 996.)

Isle of Man Cabbage—(*Brassica Monensis.*)

Stems about a foot high, loosely branched, and smooth. Leaves deeply and irregularly pinnatifid, with oblong, unequally toothed lobes. Flowers large, pale yellow. Fl. summer. Common at Southport. (E. B. xiv. 962.)

Common Wart-cress—(*Corónopus Ruéllii.*)

Stems six to twelve inches long, prostrate; leaves pinnatifid, smooth; flowers minute, white. Seed pods roundish, wrinkled, sessile. Fl. summer. Annual. (E. B. xxiv. 1660.)

* Sea Rocket—(*Cakile maritima.*)

Stems one foot high, with straggling branches; leaves few, fleshy, with a few distant and oblong lobes; whole plant smooth and glaucous; flowers large, densely corymbose, pale lilac. Fl. summer. Annual. *Hab.* sands and salt-marshes. (E. B. iv. 231.)

Flix-weed—(*Sisymbrium Sophia.*)

Stem two feet high; leaves doubly-pinnatifid, the segments short and linear; flowers greenish yellow, the petals smaller than the calyx. Fl. summer. Annual. (E. B. xiv. 963.)

XXI.—THE WINTERGREEN FAMILY. *Pyrolaceæ.*

Round-leaved Wintergreen—(*Pyrola rotundifolia.*)

Style protruding, and much curved, usually at least twice as long as the capsule. Plentiful in the little natural gardens among the sand-hills to the south of Southport. Also about the mouth of the Ribble. (E. B. iii. 213.)

XXII.—THE RHUBARB FAMILY. *Polygonaceæ.*

* Yellow Sea-dock—(*Rumex maritimus.*)

Panicle leafy and very spreading; flowers densely clustered in globular axillary whorls; the segments of the perianth with long and fine teeth. Stems twelve to eighteen inches high. Leaves narrow, lanceolate or linear. Fl. July, August. Southport, but rather scarce. (E. B. xi. 725.)

XXIV.—THE CARNATION FAMILY. *Caryophyllaceæ.*

† Common Bladder-campion—(*Silene inflata.* Flora, p. 143.)
Common at Southport.

* Sea Bladder-campion—(*Silene maritima.*)

Distinguished from the preceding by its procumbent stems, very narrow leaves, and almost solitary flowers. Fl. July, August. Southport. (E. B. xiv. 957.)

English Catch-fly—(*Silene Anglica.*)

Stems six to twelve inches high. Flowers small, axillary, forming unilateral spikes; calyx very hairy, ten-ribbed, much contracted at the top. Petals pale red or white. Fl. June, July. Annual. Common in cornfields between Southport and Churchtown. (E. B. xvii. 1178.)

† Corn-cockle—(*Agrostemma Githago.* Flora, p. 143.)
Common and fine at Southport.

* Sea Sandwort—(*Arenaria marina.*)

Distinguished from the red sandwort (Flora, p. 143) by its thicker, somewhat fleshy leaves, larger flowers and capsules, and by having the seeds usually bordered with a membranous wing. Fl. June, July. Annual. (E. B. xiv. 958.)

* Four-rowed Sandwort—(*Arenaria peploides.*)

Leaves egg-shaped, half an inch long, fleshy, in four close vertical rows; whole plant smooth and very succulent. Flowers white and inconspicuous. Fl. June, July. On the sands, common. Southshore. (E. B. iii. 189.)

† Thyme-leaved Sandwort—(*Arenaria serpyllifolia.* Flora, p. 147.)
Common at Southport.

XXXVIII.—THE SPINACH FAMILY. *Chenopodeæ.*

* Prickly Saltwort. (*Sálsola Kali.*)

Stems prostrate, very much branched and bushy; leaves linear, short, stiff, ending in sharp thorns. Flowers inconspicuous. Plant very dark-green. Fl. July. Annual. Common on the sands. (E. B. ix. 634.)

* Common Glasswort—(*Salicórnia herbácea.*)

Stems three to twelve inches high, with numerous short cylindrical branches, but no leaves. Flowers green, inconspicuous. Annual. Common at Southport, in salt and muddy places. (E. B. vi. 415.)

* Creeping Glasswort—(*Salicórnia rádicans.*)

Distinguished from the preceding by the stem being decumbent and rooting at the base. Common at Southport. (E. B. xxiv. 1691.)

* Sea Goosefoot—(*Chenopódium maritimum.*)

Leaves semi-cylindrical, sessile, tapering. Flowers axillary and sessile. Stem three feet high, branched. Fl. July, August. Annual. Southport. (E. B. ix. 633.)

XL.—THE BIRD'S-NEST FAMILY. *Monotropaceæ.* (Flora, p. 164.)

Yellow Bird's-nest—(*Monótropa Hypópithys.*)

Stem about eight inches high, simple, with oblong or ovate scales instead of leaves. Flowers few, in a short, terminal, half-drooping raceme. Whole plant of a pale yellowish brown. The lateral blossoms have their parts in fives, the terminal ones in fours. Fl. July. Abundant in marshy places at Southport, growing among the dwarf willows. (E. B. i. 69.)

XLIX.—THE PEA FAMILY *Leguminosæ.*

† Rest-harrow—(*Ononis arvensis.* Flora, p. 176.)
Abundant in sandy ground near the sea.

Yellow Kidney-vetch—(*Anthyllis Vulnerária.*)

Leaves pinnate, with a terminal leaflet. Stems about a foot high. Flowers in dense globular heads, which usually grow two together; calyx very hairy; corolla yellow. Fl. June—September. Dry places, common. (E. B. ii. 104.)

† Common Melilot—(*Melilotus officinalis.* Flora, p. 181.)
Common at Formby, &c.

† Hare's-foot Trefoil—(*Trifolium arvénse.* Flora, p. 182.)
Common at Southport in dry fields.

Strawberry Clover—(*Trifolium fragiferum.*)

Stems prostrate, creeping, twelve to eighteen inches long. Leaves trifoliolate. Flowers rose-coloured, in compact roundish heads, which are elevated on peduncles two to four inches long. Calyx much inflated after flowering, thin, membranous and reticulated. Fl. July, August. Common at Southport. (E. B. xv. 1050, but not good.)

LIII.—THE ROSE FAMILY. *Rosaceæ.*

* Burnet Rose—(*Rosa spinosissima.*)

Stems one to two feet high, erect, very prickly. Leaves pinnate, the leaflets in seven to nine pairs, small, roundish, and nearly glabrous. Flowers rather small, white or yellowish, solitary at the ends of the short branches. Fruit globular, smooth, purplish black. Fl. June, July. Abundant on the sand-hills. Southport. New Brighton. (E. B. iii. 187.)

LXI.—THE GENTIAN FAMILY. *Gentianaceæ.*

† Autumnal Gentian—(*Gentiana Amarella.* Flora, p. 217.)
Dry pastures, &c., Southport. Southshore.

† Field Gentian—(*Gentiana campestris.* Flora, p. 217.)
Similar places.

† Chlora—(*Chlora perfoliata.* Flora, p. 216.)
Sand-hills at Southport, abundant.

* Blushwort—(*Erythræa Centaurium.* Flora, p. 215.)

In addition to the normal or inland form of this plant, there grow on the sands at Southport and thereabouts, varieties with narrower and broader leaves, and of stature more or less diminutive, called by those who esteem them species, *Erythræa littoralis* (E. B. xxxiii. 2305), *Erythræa latifolia* (E. B., Supp. ii. 2719) and *Erythræa pulchella* (E. B. vii. 458).

LXIII.—THE POTATO FAMILY. *Solanaceæ.*

† Black-fruited Nightshade—(*Solanum nigrum.* Flora, p. 223.)

Common about the sand-hills at Southport.

Henbane—(*Hyoscyamus niger.*)

Stems one to three feet high. Leaves simple, sessile; petals large, buff-coloured, beautifully laced with purple veins. Whole plant clammy, and with a strong and disagreeable odour. Fl. June, July. Sand-hills between Southport and Liverpool. (E. B. ix. 591.)

LXIV.—THE SAXIFRAGE FAMILY. *Saxifragaceæ.*

† Grass of Parnassus—(*Parnássia palústris.* Flora, p. 226.)

No spectacle is more beautiful about the end of August, than to go among the sand-hills at Southport, and look down into the little valleys that lie between, filled with the snow-white flowers of this lovely plant, the purple gentianas, and twenty others. Plentiful also in the meadows behind the sand-hills at South-shore. (September 4th, 1857.)

† Rue-leaved Saxifrage—(*Saxifraga tridactylites.* Flora, p. 226.)

Sand-hills at Southport, &c., common.

LXV.—THE CONVOLVULUS FAMILY. *Convolvulaceæ.*

* Sea Convolvulus—(*Convólvulus Soldanélla.*)

Stems short, prostrate, and scarcely twining. Leaves small, thick, broadly rounded or kidney-shaped, with broad, rounded, or angular lobes at the base, and on long petioles. Peduncles one-flowered. Corolla large, purplish or rose-coloured, with pale yellow plaits, expanding only in sunshine, and of very short duration. Fl. summer. *Hab.* sand-hills. (E. B. v. 314.)

† Field Convolvulus—(*Convolvulus arvensis.* Flora, p. 230.)

Southport, &c., between there and Liverpool.

LXVIII.—THE BORAGE FAMILY. *Boraginàceæ.*

HOUND'S-TONGUE—(*Cynoglóssum officinále.*)

Stem stout, erect, two feet high, branched, and rough with hairs. Leaves lanceolate, upper ones sessile, and the whole soft with fine down. Flowers in numerous simple racemes. Corolla small, dull purplish red. Fruits four together, large, flat, and prickly. The whole plant has a disagreeable smell. Fl. July. Common all along the coast. Any one wanting seeds, need but walk where the plant grows thickly, and plenty will come home clinging to the clothes. (E. B. i. 36.)

† VIPERS' BUGLOSS—(*Echium vulgare.* Flora, p. 238.)

Sand-hills at Formby, &c.

LXXII.—THE SAGE FAMILY. *Labiatæ.*

WILD THYME—(*Thymus Serpyllum.*)

Stems procumbent, slender, much branched, growing in dense tufts. Leaves small, oblong or ovate. Flowers very numerous, in short terminal spikes. Corolla crimson or purplish. Whole plant aromatic. Fl. summer. (E. B. xxii. 1514.)

LXXIV.—THE FOXGLOVE FAMILY. *Scrofulariàceæ.*

YELLOW VISCID BARTSIA—(*Bartsia viscósa.*)

Stem twelve inches high, rigid, and erect; leaves lanceolate, coarsely toothed; flowers yellow, in a long terminal spike. Whole plant more or less clothed with short and glutinous down. Fl. summer and autumn. Annual. (E. B. xv. 1045.)

† NARROW-LEAVED BOG SPEEDWELL—(*Veronica scutellata.* Flora, p. 256.)

Common at Southport.

† GREAT WATER SPEEDWELL—(*Veronica Anagallis.* Flora, p. 256.)

Common at Southport,

LXXVI.—THE PRIMROSE FAMILY. *Primuláceæ.*

† WATER FEATHERFOIL—(*Hottónia palústris.* Flora, p. 266.)

Water courses and ditches near Southport, abundant.

† CHAFF-WEED—(*Centúnculus minimus.* Flora, p. 266.)

Southport. (Mr. Sidebotham.)

† Bog Pimpernel—(*Anagallis tenella.* Flora, p. 267.)
Southport, &c.

* Glaux—(*Glaux maritima.*)

Stems three to six inches high, much branched, glabrous, and somewhat succulent. Leaves small, ovate or oblong, mostly opposite, sessile, and entire. Flowers numerous, axillary, pink or purplish. Fl. summer. Salt marshes and muddy places at Southport. (E. B. i. 13.)

Samolus—(*Samolus Valerándi.*)

Stems three to eighteen inches high, glabrous, upright, and somewhat branched. Leaves obovate or oblong, chiefly radical. Flowers small, white, in long, loose racemes, their pedicels rather long. Fl. July, August. Common at Southport in wet places among the sand-hills. (E. B. x. 703.)

LXXX.—THE THRIFT FAMILY. *Plumbaginaceæ.*

Thrift—(*Arméria maritima.* Flora, p. 274.)

Below Southshore. Plentiful at Southport.

LXXXI.—THE RIBWORT FAMILY. *Plantagineæ.*

† Buck's-horn—(*Plantágo Corónopus.* Flora, p. 276.)

Abundant in dry places all along the coast.

* Sea Ribwort—(*Plantágo maritima.*)

Leaves narrow linear, channelled, thick, and fleshy. Spikes cylindrical, one to three inches long. Fl. July—September. Muddy places all along the coast. (E. B. iii. 175.)

† Littorella—(*Littorella lacustris.* Flora, p. 276.)
Southport, &c.

LXXXIV.—THE FUCHSIA FAMILY. *Onagraceæ.*

Evening Primrose—(*Œnóthera biénnis.*)

Stems two to three feet high, nearly simple, leafy. Leaves alternate, ovate-lanceolate, slightly toothed. Flowers in terminal spikes, large, yellow, with all the parts in fours, very handsome, fragrant, and not opening till towards evening. Fl. July—September. Biennial. Birkdale, plentiful. A North American plant, very common in gardens, and now naturalized. (E. B. xxi. 1534.)

LXXXV.—THE WATER FEATHERWEED FAMILY. *Haloragea.*

Mare's-tail—(*Hippúris vulgáris.*)

Stems simple, erect, rising eight or ten inches out of the water. Leaves narrow linear, in crowded whorls of about twelve each, two or three inches long at the base of the stem, but gradually shortening towards the top. Flowers minute, sessile in the axils of the upper leaves. Perianth absent; stamen solitary; anther large and red; ovary single. Fl. summer. Plentiful in ditches at Southport, where it is called "witches'-milk." (E. B. xi. 763.)

XCIII.—THE DAISY FAMILY. *Compositæ.*

* Sea Star-flower—(*Aster Tripólium.*)

Stem nine to eighteen inches high, branched, round, and smooth. Leaves lanceolate, entire, fleshy. Flowers numerous, large, with a yellow disk and purple rays, resembling those of the "Michaelmas-daisy" or "Farewell-summer." Common along the coast. (E. B. ii. 87.)

† Carline Thistle—(*Carlina vulgaris.* Flora, p. 307.)

Sand-hills at Southport.

† Nodding Musk-thistle—(*Carduus nutans.* Flora, p. 299.)

Abundant about Scarisbrick.

Slender Thistle—(*Carduus tenuiflorus.*)

Stems stiff, one to four feet high, slender. Leaves pinnatifid, with short, wavy, very prickly lobes, and decurrent down the stem, giving it waved and prickly wings, as in the marsh thistle, or *C. palustris*, from which it is immediately distinguished by the simple hairs of the pappus, those of the *palustris* being feathery. Fl. all summer. Annual. Common at Southport. (E. B. vi. 412.)

* Sea Wormwood—(*Artemisia maritima.*)

Stems much branched, more or less covered, along with the foliage, with close, white cottony down. Leaves doubly pinnate, the segments linear. Flower-heads very small, cylindrical, yellowish, containing three to six florets. Fl. August. Abundant at Southport. (E. B. xxiv. 1706.)

Great Crimson Centaury—(*Centauréa Scabiósa.*)

Distinguished from the "hard-heads" (*Centauréa nigra*, Flora, p. 308) by its deeply pinnatifid leaves, and the abundant and spreading rays or coronet of its large and handsome crimson flowers. Common in dry places at Southport. Fl. July—September. (E. B. i. 56.)

† Fleabane—(*Erigeron acre.* Flora, p. 315.)

Stems six to twelve inches high, erect, branched, downy. Leaves small, lanceolate, obtuse, sessile. Flowers numerous, small, with a yellow disk and lilac rays, the latter erect, and scarcely longer than the disk. Fl. July. Southport, in dry places. (E. B. xvii. 1158.)

XCIX.—THE WOODRUFF FAMILY. *Galiăceæ.*

† Sweet Yellow Galium—(*Galium verum.* Flora, p. 328.)

In the greatest abundance on and about the sand-hills, &c., all along the coast.

CI.—THE PARSLEY FAMILY. *Umbelliferæ.*

* Eryngo—(*Eryngium maritimum.*)

Stems twelve inches high, much branched; root leaves roundish, on long stalks; upper ones sessile, the whole very veiny, stiff, thin, dry, and with intensely thorny edges. Flowers blue, in large oval heads, surrounded by a prickly involucre. Whole plant of a peculiar blueish-white colour. Fl. July, August. Common on the sand-hills. Very abundant below Southshore, September 4th, 1857. (E. B. x. 718.)

† Wild Celery—(*Apium graveolens.* Flora, p. 337.)

Common in muddy places.

† Wild Carrot—*Daucus Carota.* Flora, p. 341.)

Very abundant, especially at Blackpool.

† Tubular Dropwort—(*Œnanthe fistulosa.* Flora, p. 339.)

Common at Southport.

CIII.—THE NETTLE FAMILY. *Urticaceæ.*

Pill Nettle—(*Urtica pilulifera.*)

Distinguished from the other two nettles by the female flowers growing in stalked globular heads. Plant coarse, two feet high. Fl. July. Annual, Southport, *Mr. Sidebotham.* (E. B. ii. 148.)

CXIII.—THE BOX-TREE FAMILY. *Euphorbiaceæ.*

* Sea Spurge—(*Euphorbia Paralias.*)

Stems numerous, six inches to two feet high, crowded with short, concave, rather thick and leathery leaves, of a very pale green. Umbel of five rays. Glands of the involucre crescent-shaped, with sharp points. Seeds *smooth.* Sand-hills, &c. Southport, plentiful. Fl. July, August. (E. B. iii. 195.)

PORTLAND SPURGE—(*Euphorbia Portlandica.*)

Stems several, three to twelve inches high; leaves narrow, thin, pale green or glaucous. Umbel of five rays, spreading, and repeatedly forked; bracts all very broadly cordate. Seeds *pitted.* Fl. July, August. Abundant at Southport. (E. B. vii. 441.)

CXVIII.—THE POPLAR FAMILY. *Salicaceæ.*

† DWARF SILVERY WILLOW—(*Salix argentea.* Flora, p. 379.)

Stems much branched, one to four feet high; the young shoots and foliage more or less white with silky down. Leaves oval or lanceolate, above an inch long. Abundant among the sand-hills all along the coast. Fl. April, May. (E. B. xix. 1364.)

CXXVII.—THE ORCHIS FAMILY. *Orchidáceæ.*

MARSH EPIPACTIS—(*Epipactis palustris.*)

Distinguished from the *Epipactis latifolia* (Flora, p. 393) by all the bracts being shorter than the flowers, the lower ones in the *latifolia* being *longer.* The raceme is closer, not one-sided; the leaves narrower, and the plant smaller generally. Fl. July, August. (E. B. iv. 270.)

CXXXIII.—THE ALISMA FAMILY. *Alismáceæ.*

* SEA TRIGLOCHIN—(*Triglochin maritimum.*)

Distinguished from the marsh triglochin (Flora, p. 404) by the six-celled capsule, that of the latter being three-celled. (E. B. iv. 255.)

† UMBELLED ALISMA—(*Alisma ranunculoides.* Flora, p. 404.)
Common at Southport.

CXLIV.—THE GRASS FAMILY. *Graminaceæ.*

* SEA CAT'S-TAIL—(*Phleum arenarium.*)

Distinguished from the meadow cat's-tail (*Phleum pratense,* Flora, p. 431) by its *annual* root, and spike not exceeding an inch and a half in length. Fl. June. Common on the sand-hills. (E. B. iv. 222.)

* SEA WHEAT-GRASS—(*Triticum junceum.*)

Straws and leaves eighteen inches to two feet high; raceme four to six inches long, consisting of a few rather distant and large spikelets. Fl. August. *Hab.* sand-hills. (E. B. xii. 314.)

* Sea Mat-grass—(*Ammophila arundinacea.*)

Underground stems extensively creeping. Straws and leaves eighteen inches to three feet high, erect, and very stiff. Spike four to six inches long, dense, tapering at each end. Fl. July. Common everywhere on the sand-hills. (Curtis, iv. 585; E.B. viii. 520; both as *Arundo arenaria.*)

† Small wood-reed—(*Calamagrostis lanceolata.* Flora, p. 432.)

Common at Southport.

† Silvery Hair-grass—(*Aira caryophyllea.* Flora, p. 433.)

† Vernal Hair-grass—(*Aira præcox.* Flora, p. 432.)

Both species common on the sand-hills at Southport.

CXLV.—THE SEDGE FAMILY. *Cyperáceæ.*

* Sand-hill Carex—(*Carex arenaria.*)

Underground stems very long and creeping; flowering ones six to nine inches high. Spikelets rather large, ovoid, crowded eight or ten together into a terminal spike one or two inches in length. Fl. June, July. Abundant on the sand-hills at Southport. (E. B. viii. 928.)

* Soft Brown Carex—(*Carex intermedia.* Flora, p. 454.)

Abundant and fine in ditches at Southport.

CLIV.—THE HORSE-TAIL FAMILY. *Equisetaceæ.*

Variegated Horse-tail—(*Equisetum variegatum.*)

Stems slender, simple, or very rarely branched, six to eight inches high, the central one sometimes taller. Furrows of the stem and teeth of the sheaths eight or ten. Fl. July, August. Southport. *Mr. Sidebotham.* (E.B. xxviii. 1987.)

GLOSSARY,

OR

LIST OF TECHNICAL TERMS,

Comprising all that occur in this volume, with references to the pages where the meaning is explained, or more fully set forth; together with many that occur in other botanical books, and the principal adjectives used as the Latin specific names of plants. The Latin *generic* names do not come within the scope of a glossary. They have been derived from a vast variety of sources, and form an independent subject of consideration.

Specific names that end in *i*, such as *Koehleri*, *Œderi*, *Bobartii*, are commemorative, or given in honour of eminent botanists. Many others, spelt with an initial capital, such as *Millefolium*, *Opulus*, and *Ebulus*, are ancient appellations of the plants, and come in the same category as the generic names.

A few of the adjective terms used by botanists, and included in the following list, have been adopted or constructed from the Greek language. To distinguish them, they are marked *.

The letters *a*, *um*, following a Latin adjective ending in *us*, indicate the different terminations it possesses, according as it is connected with a masculine, feminine, or neuter substantive. Thus, acetos*us*, acetos*a*, acetos*um*. Adjectives ending in *is* similarly change their final letters into *e*, as acr*is*, acr*e*.

Abnormal, contrary to usual structure.
Abrupt leaf, see p. 19.
*Acaulis, stemless, *i. e.*, having so short a stem as to seem destitute of one.
Acetosus, a, um, ella, sour.
*Achenium, a seed-like fruit. See p. 38.
*Achlamydeous, without either calyx or corolla.
Acicularis, needle-shaped.
Acris, e, biting to the taste.
*Acrogens, flowerless plants; the same as Cryptogamia.
Aculeatus, a, um, armed with minute prickles.
Acuminate (leaf), see p. 19.
Acutus, a, um, sharp-pointed.
Aerial, growing perched upon the stems of other plants, as opposed to having roots in the ground.
——— growing or partly so, in the air, as opposed to living wholly in the water.
Æruginosus, verdigris-coloured.
Æstivalis, belonging to the summer.
Agrestis, e, growing in waste and ploughed land.
Alatus, a, um, furnished with a membranous wing.
Albumen (of seed), the floury matter stored up in the seed for the nourishment of the embryo when it germinates.

ALBUS, A, UM, white.
ALBIDUS, dirty white.
ALPINUS, A, UM, growing on mountains in cold countries.
ALTERNATE LEAVES, see p. 21.
AMARUS, A, UM, bitter.
AMPLEXICAULENT, stem-clasping. See p. 10.
ANGLICUS, A, UM, native of England.
ANGUSTIFOLIUS, A, UM, narrow-leaved.
ANNUAL, see p. 10.
*ANTHER, see p. 27.
*ANTHODIUM, see p. 32.
ANTIQUORUM, "of the ancients," *i.e.*, anciently so called.
*APETALOUS, destitute of petals.
APEX, the very top or summit.
APPRESSED (leaves), having their upper surfaces pressed against the stem.
AQUATIC, AQUATICUS, A, UM, living *in* water.
AQUATILIS, E, living *under* water.
ARBORESCENT, tree-like.
ARBOREUS, A, UM, branching like a tree.
*ARCTICUS, A, UM, native of the north frigid zone
ARGENTEUS, A, UM, silvery-looking.
ARILLUS, see p. 209.
ARTICULATED, jointed.
ARVENSIS, E, growing in ploughed fields.
ASPER; ASPERRIMUS, A, UM, rough, very rough.
AURANTIACUS, A, UM, orange-coloured.
AUREUS, A, UM, gold-coloured.
AURICLES (of leaves), see p. 10.
AURITUS, A, UM, having little appendages resembling ears.
AVICULARIS, E; AVIUM, useful as supplying food to birds.
AWNS, the long bristles of grasses. See p. 423.
AXIL, AXILLARY, see p. 22, 35.
AXILE (placenta), occupying the centre of the ovary, without being attached to its walls.
*AXIS, the theoretical central shaft or "pole" of the plant, around which all the other parts are disposed.

BACCATUS, A, UM, bearing berries.
BICOLOR, two-coloured.
BIENNIAL, living for portions of two successive years. See p. 10.
BIFID, deeply cleft down the middle.
BINATE (leaves), see p. 13.
BISEXUAL (flowers), having both stamens and pistil in the same blossom. See p. 30.
BLADE, the flat or expanded part of a leaf.
BOREALIS, E, belonging to northern latitudes.
BRACTS, leafy organs intermediate between the true leaves and the calyx. See p. 37.
BUDS, the young unfolded leaves and other parts.
BULBOUS (roots), see p. 7.
BUTTERFLY-SHAPED (flower), see p. 171.

CÆLESTIS, E, and CÆRULEUS, A, UM, sky-blue.
CÆSIUS, A, UM, grayish lavender-coloured.
CÆSPITOSUS, A, UM, growing in dense tufts or patches.
CALCAREUS, A, UM, growing in limestone earth.
*CALYX, the outer of the floral envelopes. See p. 24.
CAMBRICUS, A, UM, native of Wales.
CAMPESTRIS, E, growing in the open fields.
CANDIDUS, A, UM, pure white, but not the whiteness of snow.
CANESCENS; CANUS, A, UM; hoary.
CANINUS, A, UM, belonging to dogs.
CAPILLACEUS, A, UM; CAPILLARIS, E; as slender as a hair or *capillus*.
CAPITATE, having a round head, like a pin.
CAPREOLATUS, A, UM, scrambling among other plants.
CAPSULE, a kind of seed-pod. See p. 38.
CARNEUS, A, UM, flesh-coloured, such as the palest rose.
*CARPELS, see p. 38.
CATKIN, a kind of inflorescence. See p. 36.
CAUDATUS, A, UM, having or resembling a long tail.
CAUDEX (of the root), see p. 7.
CELLS, see p. 27.
CERNUUS, A, UM, half-pendulous or nodding.
*CHAMÆ, dwarf, or a miniature representation or reminder of, e.g.
*——— DRYS, dwarf oak.
*——— MORUS, dwarf mulberry.
CHANNELLED, hollowed longthways, like a gutter.
CILIATED (leaves), see p. 19.
CINEREUS, A, UM, the colour of ashes.
CIRCINATE, rolled inwards. See p. 36.
CLAVATUS, A, UM, bearing little clubs.
CLAVICULATUS, A, UM, scrambling.
COCCINEUS, A, UM, scarlet, *i.e.*, carmine tinged with yellow.
CŒNOSUS, A, UM, growing in mud.

COLOURED, of any hue except *green*, which colour is in botany always spoken of under its own name.
COMMUNIS, E, found everywhere.
COMPOUND FLOWERS, see p. 31.
——— LEAVES, see p. 13.
COMPRESSED, flattened lengthways, like the pod of a pea.
CONE, the fruit of such trees as the fir.
CONGESTUS, A, UM, densely crowded.
CONNATE (leaves), see p. 325.
CORDATE, heart-shaped.
*CORMOGENS, see p. 45.
*CORMUS, see p. 8.
CORNICULATUS, A, UM, having a hard point like a horn.
COROLLA, see p. 23.
*CORYMB, see p. 35.
*COTYLEDONS, the rudimentary leaves in the seed. See p. 39.
CRASSIFOLIUS, A, UM, thick-leaved.
CRENATE (leaves), having the margin scolloped. See p. 18.
CRUCIATUS, A, UM, in four equal parts, like a cabbage blossom.
*CRYPTOGAMIA, flowerless plants. See p. 40.
CUPULE, a little cup, like that of an acorn. See p. 364.
CUTICLE, see p. 22
*CYME, see p. 35.

DECIDUOUS, falling off at the close of the season.
DECUMBENT, lying flat on the ground, but rising at the extremity.
DECURRENT (leaf), see p. 11.
DEHISCENT (seed-pods), busting open when ripe.
DENSIFLORUS, A, UM, having the flowers densely clustered.
DENTICULATUS, A, UM, finely toothed.
DEPRESSUS, A, UM, growing low on the ground.
*DIADELPHOUS (stamens), see p. 173.
*DICHLAMYDEOUS, having both calyx and corolla.
*DICHOTOMOUS STEM, see p. 9.
*DICLINOUS, the same as "unisexual."
*DICOTYLEDONOUS, having two seed-leaves attached to the embryo.
*DICOTYLEDONS, exogens.
*DIDYNAMOUS (stamens), two long and two short. See p. 244.
DIFFUSE, widely-spreading; applied to stems and branches.
DIGITATE LEAVES, see p. 14.
DILATATUS, A, UM, flattened out widely.
*DIŒCIOUS, see p. 363.
DISCOLOR, of a different colour above and below.
DISSECTUS, A, UM, very finely divided and subdivided.
DIVERGENT, spreading away from one another.
DIVERSIFOLIUS, A, UM, having leaves of two or more shapes.
DIVIDED (leaves), see p. 14.
DOTTED (leaves), see p. 21.
DOUBLE FLOWERS, see, p. 30, 294.
——— PERIANTH, see p. 26.
DRUPACEOUS, DRUPE, see p. 38.

ECHINATUS, A, UM, prickly, like a hedgehog, as the fruit of the Spanish chesnut.
EFFUSUS, A, UM, widely-spreading, like *diffuse*.
ELATUS, A, UM; ELATIOR; tall, taller, *i.e.* than their particular organs would have led us to expect.
*EMBRYO, the rudimentary plant contained in the seed. See p. 39.
*ENDOGENS, see p. 42, 45.
ENTIRE LEAVES, see p. 18.
*EPIGYNOUS STAMENS, see p. 28.
*EPIPHYTES, see p. 391.
EQUITANT (leaves), see p. 399.
EVERGREEN LEAVES, see p. 22.
EXCELSUS, A, UM; EXCELSIOR; very tall, loftier still.
EXIGUUS, A, UM, very puny and pitiful.
EXIMIUS, A, UM, very grand and glorious.
*EXOGENS, see p. 42, 44.
EXSERTED, protruded outwards.

FAN-LOBED, see p. 17.
FAN-VEINED, see p. 20.
FARINOSUS, A, UM, covered with a mealy powder.
FASCICLE, see p. 35.
FASTIGIATUS, A, UM, having the branches all vertical, like a Lombardy poplar.
FATUUS, A, UM, worthless, insipid.
FEATHER-LOBED, see p. 16.
FEATHER-VEINED, see p. 20.
FERRUGINEUS, rust-coloured, *i.e.*, light brown, with a little mixture of red.
FILAMENT, the stalk supporting the anther. See p. 27.
FILIFORMIS, E, as slender as a thread or *filum*.
FISTULOSUS, A, UM, hollow like a pipe.
FLAMMULUS, A, UM, inflaming the skin with its poisonous juice.
FLAVUS, A, UM; FLAVESCENS; yellow, yellowish.
FLEXUOSUS, A, UM, crooked.

FLORAL ENVELOPES, the calyx and corolla.
FLORETS, see p. 32.
FLOWERLESS PLANTS, see p. 40, 469.
FLUITANS, floating on the surface of water.
FLUVIATILIS, E, growing by rivers.
FOLLICLE, a kind of fruit. See p. 90.
FORK-VEINED (leaf), see p. 20.
FORMOSUS, A, UM, strikingly beautiful.
FRAGILIS, E, brittle.
FREE, not adhering to adjacent organs.
FROND, see p. 470.
FRUIT, the ripened seed-pod of a plant, and its contents.
FRUTICOSUS, A, UM, shrubby.
FRUTICULOSUS, A, UM, under-shrubby.
FULVUS, A, UM, tawny-coloured.

GEMMA, a leaf-bud.
GENERA, see p. 49.
GENICULATUS, A, UM, bent like a knee.
GENUS, see p. 49.
GERMEN, another name for the ovary. See p. 26.
GERMINATION, the sprouting of the young plant from the seed.
GIBBOUS, swollen.
GLABROUS, see p. 19.
GLANDS, wart-like swellings, or pustules.
GLANDULAR, bearing glands.
*GLAUCOUS, covered with bloom, like a ripe plum. See p. 19.
GLOMERATUS, A, UM, densely clustered.
GLUMES, GLUMELLES, see p. 423.
GRANULATUS, A, UM, resembling grains or little seeds.
GRAVEOLENS, strong-smelling, offensive, because of the intensity.
GYRATE, the same as "circinate."

HABITATS, see p. 55.
HASTATE (leaf), see p. 12.
HEDERACEUS, A, UM, ivy-leaved, or climbing like ivy.
HERBACEOUS, having green succulent, annual stems. See p. 10.
——— (flower), green and leafy in texture instead of petaloid.
*HETEROPHYLLUS, A, UM, having leaves of two or more shapes, same as "diversifolius."
HIRSUTUS, A, UM, } covered with long stiff
HIRTUS, A, UM, } hairs.
HISPIDUS, A, UM, covered with long and very harsh hairs.
HORTENSIS, E, cultivated in gardens.
HUMIFUSUS, A, UM, spreading low upon the ground.
HUMILIS, E, humble and unpretentious, compared with its congeners.
HYBRID, a plant resulting from the fecundation of one species by another.
*HYPOGYNOUS, growing from below the base of the ovary. See p. 28.

IMBRICATED (leaves), see p. 22
IMPERFECT (plants), see p. 40.
INCOMPLETE (flowers), see p. 33.
INCURVED, coiled inwards. See p. 36.
INDIGENOUS, truly and aboriginally native.
INFERIOR (ovary), see p. 28.
INFLORESCENCE, see p. 34.
INSIGNIS, E, noble, admirable, conspicuous.
INTERNODES, see p. 8.
INTERPETIOLAR, between the petioles of opposite leaves.
INUNDATUS, A, UM, growing in places often overflowed.
INVOLUCRUM, a whorl of bracts. See p. 333.
IRREGULAR FLOWERS, see p. 24.

JAPONICUS, A, UM, native of Japan.
JUNCEUS, A, UM, resembling rushes.

LACINIATED, irregularly cut into narrow segments.
LACTESCENT, yielding milky juice.
LACUSTRIS, E, growing on the borders of lakes.
LÆVIGATUS, A, UM, having a smooth and polished surface.
LÆVIS, even, smooth, and level.
LAMINA (of leaf), see p. 10.
*LAMPROCARPUS, A, UM, shining-fruited.
LANCEOLATE, see p. 12.
LATERAL, arising from the side.
LATERITIUS, A, UM, the colour of new bricks.
LATIFOLIUS, A, UM, broad-leaved.
LEGUME, a kind of seed-pod. See p. 38.
*LEUCOSTACHYS, white-flowered, or white-stalked.
LIGNEOUS, woody in texture.
LIGULE, see p. 421.
LIMB, the broad flat part of a leaf or petal.
LIMOSUS, A, UM, growing in muddy places.
LINEAR, very narrow. See p. 12.
LITTORALIS, growing on the sea-shore.
LOBED COROLLA, see p. 24.
——— LEAVES, see p. 14.
LOCALITIES, see p. 55.
LUCIDUS, A, UM, shining.

LUNATE, crescent-shaped.
LUSITANICUS, A, UM, native of Portugal.
LUTEUS, A, UM, yellow.
LUTEOLUS, A, UM, yellowish.
LYRATE LEAVES, see p. 16.

*MACROPHYLLUS, A, UM, long or large-leaved.
MACULATUS, A, UM, spotted.
MAGNUS, A, UM, great.
MAJOR, MAJUS, large, larger.
MASCULUS, A, UM, male or masculine.
*MICROPHYLLUS, A, UM, having very small leaves.
MINUS, MINOR, MINIMUS, A, UM, little, less, least.
MOLLIS, soft.
*MONOCOTYLEDONS, Endogens.
*MONOCOTYLEDONOUS, having only one seed-leaf to the embryo.
*MONŒCIOUS, having the stamens and pistils in separate flowers, but on the same tree or plant. See p. 363.
MONTANUS, A, UM, growing on mountains.
MOSCHATUS, A, UM, smelling like musk.
MULTICAULIS, E, many-stalked.
MULTIFLORUS, A, UM, many-flowered.
MURICATUS, A, UM, covered with short prickles.
MURORUM, of walls, *i. e.*, growing upon walls.

NATANS, swimming or floating.
*NECTARY, the honey-cup of a flower. See p. 29.
NEMORALIS, NEMOROSUS, A, UM, growing in woods and groves.
NET-VEINED (leaves), see p. 20.
NIGER, NIGRA, NIGRUM, NIGRESCENS, NIGRICANS, black, blackish.
NITIDUS, A, UM, bright and shining.
NIVALIS, accompanying or growing near snow.
NIVEUS, A, UM, snow-white.
NOBILIS, E, eminent, celebrated.
NODES, the joints of the stem. See p. 8.
NODIFLORUS, A, UM, having the flowers at the nodes.
NODOSUS, having swollen joints.
NUDI, naked, *i. e.*, destitute of leaves where usually present, as nudicaulis, nudiflorus.
NUTANS, nodding or half-pendulous.

OBOVATE (leaf), see p. 12.
OBTUSE, rounded or blunted at the extremity.
*OCHROLEUCUS, A, UM, cream-coloured.
OCREA, a kind of stipule. See p. 133.
ODORATUS, A, UM, sweet-smelling.
OFFICINALIS, E, sold in the druggists' shops, or formerly so.
OLERACEUS, A, UM, useful as an esculent pot-herb.
OLIDUS, A, UM, having a strong and unpleasant smell.
OLITORIUS, A, UM, same as *oleraceus*.
OPPOSITE (leaves), see p. 21.
ORIENTALIS, of or from the southern parts of Asia.
OVAL (leaf), see p. 12.
OVARY, the rudimentary or incipient seed-pod. See p. 26.
OVATE (leaf), see p. 12.
OVINUS, A, UM, pertaining to sheep.
OVULES, the rudimentary seeds contained in the ovary. See p. 26.

PALLESCENS, pale yellowish-green.
PALMATE (leaf), see p. 17.
PALUDOSUS, A, UM, and PALUSTRIS, E, growing in marshy places.
PANICLE, see p. 36.
PANICULATUS, A, UM, bearing the flowers in panicles.
*PANTOTHRIX, hair-like throughout. See p. 86.
PAPILIONACEOUS (corolla), see p. 172.
*PAPPUS, see p. 292.
PARALLEL-VEINED (leaves), see p. 20.
PARASITES, see p. 163, 212, 231.
PARIETAL (placenta), attached to the walls or interior surface of the ovary.
PARVIFLORUS, small-flowered.
PARVIFOLIUS, small-leaved.
PATENS, spreading wide open.
PECTINATE (leaf), comb-like. See p. 16.
PEDUNCLE, PEDICEL, the stalk of a flower. See p. 34.
PELTATE, formed like a shield, with the stalk in the centre of the circle.
PENNATUS, A, UM, feather-like.
*PENTAMEROUS, composed of five or twice five equal parts.
PERENNIAL, PERENNIS, E, living many years. See p. 10.
PERFECT PLANTS, see p. 5.
PERFOLIATE (stem), see p. 570.
*PERIANTH, see p. 26.
*PERICARP, seed-pod.
*PERIGYNOUS STAMENS, see p. 28.
PERPUSILLUS, very small and weak.
PERSONATE (corolla), formed like the muzzle of a quadruped.
PERULES, see p. 367.
*PETALOID, of the texture of petals.
*PETALS, the individual pieces or "leaves" of the corolla.

PETIOLE, the stalk of the leaf. See p. 10.
PICTUS, A, UM, richly coloured with many hues, as if painted.
PILEUS, the convex part of a mushroom or toadstool. See p. 523.
PILOSUS, A, UM, softly hairy.
PILULIFERUS, A, UM, bearing little globular heads resembling pills.
PINNATE (leaf), see p. 13.
PINNATIFID (leaf), see p. 16.
*PISTIL, the female organs of the flower. See p. 26.
PLACENTA, the internal part of the ovary to which the ovules are attached.
PLICATUS, A, UM, plaited or folded, while young, like a lady's fan.
PLUMULE (of seed), see p. 39.
POLLEN, see p. 27.
*POLYMORPHUS, presented under many different aspects.
*POLYPETALOUS, many-petaled. See p. 24.
*POLYRHIZA, having many roots.
*POLYSTACHYON, with many stalks.
PRÆCOX, early in blossom, soon ripe.
PRATENSIS, E, growing in the meadows.
PRICKLES, hairs grown very thick and strong, and sharp at the points. See p. 194.
PROCUMBENT, lying on the ground.
*PSEUDO-, spurious or sham.
PUBESCENT, downy with abundance of short fine hairs.
PULCHER, PULCHRA, PULCHRUM, fair or beautiful.
PULICARIS, resembling fleas.
PULVERULENT, covered with fine powdery matter.
PUMILUS, A, UM, little; dwarfish, compared with its congeners.
PURPUREUS, A, UM, red with a dash of blue.
PUSILLUS, A, UM, small and insignificant.

QUADRANGULARIS, QUADRANGULUS, A, UM, four-cornered.
QUINATE (leaf), see p. 14.

RACEME, see p. 36.
RACEMOSUS, A, UM, having the flowers in racemes.
*RACHIS, see p. 470.
RADICAL, springing so near the ground, as to seem to arise from the root or *radix*. See p. 22.
RADICLE, the first root that descends from a germinating seed.
RAMOSUS, A, UM, divided into many branches.
RECEPTACLE, see p. 28.
RECURVED, bent backwards in an arching manner.
REGULAR (flowers), see p. 24.
RENIFORM, kidney-shaped. See p. 12.
REPENS, REPTANS, creeping along the ground, and emitting roots at intervals.
RETROFLEXED, bent backwards and downwards.
REVOLUTE, having the edges rolled back.
*RHIZOME, see p. 8.
RIBBED (leaves), see p. 20.
RIPARIUS, A, UM, and RIVALIS, E, growing on the banks of rivers.
ROSACEOUS (corollas), formed of separate, sessile, and uniform petals, as in the rose.
ROSEUS, A, UM, rose-coloured.
ROTUNDIFOLIUS, A, UM, round-leaved.
RUBER, RUBRA, RUBRUM, red.
RUGOSUS, A, UM, wrinkled or coarsely crumpled.
RUNCINATE (leaf), see p. 16.

SANGUINEUS, A, UM, blood-coloured.
SARMENTOSUS, A, UM, having long shoots.
SATIVUS, A, UM, proper for cultivation.
SAXATILIS, E, living upon or among rocks.
SCABER, BRA, BRUM, covered with short and very stiff hairs or asperities.
SCALES, imperfectly developed leaves, or bract-like substitutes for them. The name is also applied to the bracts of such flowers as grasses.
SCANDENS, climbing by any means except twining.
SCAPE, a leafless flower-stalk, arising from a tuft of radical leaves.
SCARIOUS, dry, thin, and membranous.
SCELERATUS, very hurtful; poisonous.
SCION, a young shoot.
SCOPARIUM, fit for making besoms.
SCUTATUS, SCUTELLATUS, A, UM, resembling a shield.
SECUND, all turned to one side, and looking in one direction.
SEGETUM, growing in cornfields.
SEGMENTS, see p. 14.
SEMPERFLORENS, always in blossom.
SEMPERVIRENS, evergreen.
*SEPALS, the pieces or elementary leaves of the calyx. See p. 24.
SEPIUM, growing in the hedges or on the hedgebanks.
SEPTATE (leaf), see p. 14.
SERICEUS, A, UM, silky.
SERRATED (leaf), see p. 18.
SESSILE, having no stalk. See p. 10.

SESSILIFLORUS, A, UM, flowers having no stalks.
SESSILIFOLIUS, A, UM, leaves having no stalks.
SETOSUS, A, UM, covered with bristles or strong straight hairs.
SHRUBS, see p. 10.
SILICLE and SILIQUE, forms of seed-pods. See p. 112.
SIMPLE (leaves), see p. 13.
SIMPLE (stems), unbranched. See p. 9.
SINENSIS, E, native of China.
SINUATUS, A, UM, leaves wavy along the margins.
SOMNIFERUS, A, UM, sleep-producing.
SORI, of ferns. See p. 471.
SPADIX, a succulent spike of sessile flowers. See p. 411.
*SPATHA, a large membranous bract, protecting flowers. See p. 33.
SPECIES, see p. 49.
SPECIOSUS, A, UM, and SPECTABILIS, E, very handsome and ornamental.
SPICATE, SPICATUS, A, UM, bearing the flowers in spikes.
SPIKE, see p. 36.
SPIKELETS, small clusters of flowers, in grasses, &c. See p. 423.
SPINES, see p. 195.
SPINOSUS, A, UM, armed with spines.
SPONGIOLES (of roots), see p. 7.
*SPORES, the seeds of flowerless plants. See p. 470.
STAMENS, the male organs of the flower. See p. 27.
STELLATUS, STELLULATUS, A. UM, } arranged like a star.
STEM, see p. 8.
*STIGMA, the uppermost part of the pistil. See p. 26.
STIPULES, appendages to the stalks of leaves. See p. 21.
*STOMATES, microscopic openings in the skin of leaves. See p. 22, 126.
STRIATUS, A, UM, marked with very fine parallel ridges.
STRICTUS, A, UM, growing quite erect.
STRIGOSUS, A, UM, covered with rough, strong, appressed hairs.
*STYLE, the stalk interposed between the ovary and the stigma. See p. 26.
SUAVEOLENS, sweet-scented.
SUBEROSUS, A, UM, having a corky texture.
SUCCISUS, A, UM, cut off abruptly.
SUCCULENT, unusually juicy or distended with sap.
SUPERIOR (ovary), see p. 28.
SYLVATICUS, A, UM; SYLVESTRIS, E, growing in woods.
*SYMPETALOUS, see p. 24.
*SYNGENESIOUS, having the anthers united.

TECTORUM, growing upon walls and roofs.
TENDRILS, see p. 21.
TENELLUS, A, UM, delicate and slender.
TENUIFOLIUS, A, UM, slender-leaved.
TENUIFLORUS, A, UM, lean-flowered.
TENUIS, E, thin, slender.
TERETE, nearly cylindrical.
TERNATE (leaf), see p. 17.
TERRESTRIS, E, growing on the ground.
TESTA (of seed), see p. 39.
*TETRAMEROUS (flowers), see p. 31.
*THALLOGENS, see p. 46.
*THALLUS, see p. 512.
*THECA, THECÆ, see p. 472.
THORNS, see p. 195.
*THYRSUS, a cluster of flowers resembling an upright bunch of grapes.
TINCTORIUS, A, UM, useful to the dyers.
TOMENTOSUS, A, UM, covered with cottony, entangled pubescence.
*TRIANDRUS, A, UM, three-stamened.
TRICOLOR, three-coloured.
TRIDENTATUS, A, UM, three-toothed.
TRIFOLIATUS, A, UM, ternate-leaved.
TRIFOLIOLATE LEAVES, see p. 13.
*TRIMEROUS (flowers), see p. 31.
TUBEROSUS, A, UM, having tuberous roots.
TUBEROUS (root), see p. 8.
TUBULAR, formed like a short piece of tube.
TWINING (stem), see p. 9.

ULIGINOSUS, A, UM, growing in moist and oozy places.
UNISEXUAL (flowers), see p. 30.
UMBEL, see p. 35.
UMBELLATUS, A, UM, having the flowers in umbels.

VAGINATUS, A, UM, forming a sheath.
VARIETIES OF PLANTS, see p. 49.
VEINS (of leaves), see p. 19.
VERNUS, A, UM, appearing in the spring.
VERRUCOSUS, A, UM, covered with wart-like excrescences.
VERSATILE (anthers), see p. 390.
VERSICOLOR, variegated.
VERTICILLATUS, A, UM, whorled. See p. 21.
VESICARIUS, A, UM, inflated like a bladder.

VESPERTINUS, A, UM, appearing in the evening.
VILLOSUS, A, UM, covered with long soft hairs, and having a woolly appearance.
VIMINALIS, abounding with twigs.
VIRENS, green and flourishing.
VIRGATUS, A, UM, twiggy.
VIRGINIANUS, A, UM, native of Virginia.
VIRIDIS, E, green.
VIROSUS, A, UM, venomous; full of poison.
VIVIPAROUS, producing leaf-buds in place of flowers and seeds. See p. 136.
VULGARIS, E, and VULGATUS, A, UM, common and well-known everywhere.

WAVED (leaf), see p. 19.
WHORLED (flowers), see p. 35.
——— (leaves), see p. 21.

SYSTEMATIC INDEX

TO

THE FAMILIES OF PLANTS,

Shewing the groups or "alliances" into which they are thrown by Professor Lindley, in his great work called "The Vegetable Kingdom," and the consecutive order in which that author places them in their respective classes.

A proper scientific arrangement of the families has not been practicable in the present volume, owing to the exigencies of the printing, in connection with the charts. The following list will compensate that defect, as well as supply enlarged ideas, at one view, of the relations which the families bear towards one another.

The "alliances" are composed of two or more families, just as the families are composed of genera, and the genera of species. The name is adopted from that of the principal family, and always ends in *ales*. Thus, *Ranales*, the alliance of which the *Ranunculaceæ* are the typical example. The grounds of their construction, and of the sequence given to the families, must be looked for in Lindley's work above-mentioned.

Class I.—EXOGENS.

Section 1.—BISEXUAL.

Group 1.—Ovary free within the perianth; Stamens growing on the receptacle.

Violales.

		PAGE
Passion-flower Family	*Passifloraceæ*	139
Violet "	*Violaceæ*	122
Tamarisk "	*Tamaricaceæ*	164
Stonecrop "	*Crassulaceæ*	125

Cistales.

Cistus Family	*Cistaceæ*	111
Cabbage "	*Cruciferæ* or *Brassicaceæ*	111
Mignonette "	*Resedaceæ*	121
Caper "	*Cappariderc*	164

Malvales.

Trophy-wort Family	*Tropæoleæ*	107
Mallow "	*Malvaceæ*	108
Lime-tree "	*Tiliaceæ*	110

		PAGE
SAPINDALES.		
Milk-wort Family	*Polygalaceæ*	156
Bladder-nut "	*Staphyleaceæ*	157
Horse-chesnut "	*Sapindaceæ*	157
Maple "	*Aceraceæ*	158
GUTTIFERALES.		
Camellia Family	*Ternstromiaceæ*	93
St. John's-wort "	*Hypericaceæ*	90
NYMPHALES.		
Water-lily Family	*Nymphæaceæ*	81
RANALES.		
Magnolia Family	*Magnoliaceæ*	97
Buttercup "	*Ranunculaceæ*	82
Poppy "	*Papaveraceæ*	93
BERBERALES.		
Sundew Family	*Droseraceæ*	153
Fumitory "	*Fumariaceæ*	148
Berbery "	*Berberideæ*	150
Grape-vine "	*Vitaceæ* or *Ampelideæ*	151
ERICALES.		
Epacris Family	*Epacrideæ*	131
Winter-green "	*Pyrolaceæ*	132
Monotropa "	*Monotropaceæ*	163
Heath "	*Ericaceæ*	127
RUTALES.		
Orange Family	*Aurantiaceæ*	152
Sumach "	*Anacardiaceæ*	152
Rue "	*Rutaceæ*	155
Ailantus "	*Xanthoxyleæ*	571
Elatine "	*Elatinaceæ*	155
GERANIALES.		
Flax Family	*Linaceæ*	104
Woodsorrel "	*Oxalideæ*	105
Touch-me-not "	*Balsamineæ*	97
Geranium "	*Geraniaceæ*	99
SILENALES.		
Carnation Family	*Caryophyllaceæ*	140
Purslane "	*Portulacaceæ*	148
Rhubarb "	*Polygonaceæ*	133
CHENOPODALES.		
Marvel of Peru Family	*Nyctagineæ*	165
Rivina "	*Phytolaccaceæ*	572
Amaranth "	*Amarantaceæ*	163
Spinach "	*Chenopodeæ*	160

GROUP 2.—OVARY FREE WITHIN THE PERIANTH; STAMENS GROWING ON THE CALYX OR COROLLA.

FICOIDALES.

		PAGE
Ice-plant Family	*Mesembryaceæ* or *Ficoideæ*	166
Scleranthus "	*Scleranthaceæ*	166

DAPHNALES.

Mezereon Family	*Thymelaceæ*	167
Protea "	*Proteaceæ*	168
Bay-tree "	*Lauraceæ*	169

ROSALES.

Pea Family	*Leguminosæ* or *Fabaceæ*	169
Plum "	*Drupaceæ*	190
Apple "	*Pomaceæ*	187
Lady's-mantle "	*Sanguisorbaceæ*	186
Rose "	*Rosaceæ*	193

SAXIFRAGALES.

Saxifrage Family	*Saxifragaceæ*	224
Hydrangea "	*Hydrangeaceæ*	238
Lythrum "	*Lythraceæ*	206

RHAMNALES.

Elm-tree Family	*Ulmaceæ*	204
Buckthorn "	*Rhamnaceæ*	207
Spindle-tree "	*Celastraceæ*	208

GENTIANALES.

Holly Family	*Aquifoliaceæ* or *Ilicineæ*	209
Periwinkle "	*Apocynaceæ*	210
Broomrape "	*Orobanchaceæ*	212
Gentian "	*Gentianaceæ*	213

SOLANALES.

Olive Family	*Oleaceæ*	218
Potato "	*Solanaceæ*	221
Wax-flower "	*Asclepiadaceæ*	239
Convolvulus "	*Convolvulaceæ*	229
Dodder "	*Cuscutaceæ*	231
Phlox "	*Polemoniaceæ*	271

CORTUSALES.

Nemophila Family	*Hydrophyllaceæ*	272
Thrift "	*Plumbaginaceæ*	273
Ribwort "	*Plantaginaceæ*	274
Primrose "	*Primulaceæ*	263
Ardisia "	*Myrsinaceæ*	278

ECHIALES.

A.—Flowers regular. PAGE

Jessamine Family ..... *Jasminaceæ* 233
Nolana " ..... *Nolanaceæ* 278
Borage " ..... *Boraginaceæ* 233

B.—Flowers irregular.

Sage " ..... *Labiatæ* or *Lamiaceæ* 241
Verbena " ..... *Verbenaceæ* 270
Selago " ..... *Selaginaceæ* 278

BIGNONIALES.

Gloxinia Family ..... *Gesneraceæ* 261
Bignonia " ..... *Bignoniaceæ* 240
Thunbergia " ..... *Acanthaceæ* 252
Foxglove " ..... *Scrofulariaceæ* 252
Butterwort " ..... *Lentibulariaceæ* 277

GROUP 3.—PERIANTH AND STAMENS ON THE SUMMIT OF THE OVARY.

CAMPANALES.

Harebell Family ..... *Campanulaceæ* 286
Lobelia " ..... *Lobeliaceæ* 319
Stylidium " ..... *Stylidiaceæ* 319
Valerian " ..... *Valerianaceæ* 316
Scabious " ..... *Dipsaceæ* 320
Daisy " ..... *Compositæ* or *Asteraceæ* 290

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Combretum Family ..... *Combretaceæ* 285
Water Featherweed " ..... *Haloragеæ* 283
Fuchsia " ..... *Onagraceæ* 279
Melastoma " ..... *Melastomaceæ* 284
Myrtle " ..... *Myrtaceæ* 279

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Chili-nettle Family ..... *Loasaceæ* 285
Cactus " ..... *Cactaceæ* 289

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Currant Family ..... *Grossulaceæ* 329
Escallonia " ..... *Escalloniaceæ* 343
Mock Orange " ..... *Philadelphaceæ* 319

CINCHONALES.

Whinberry Family ..... *Vacciniaceæ* 343
Coffee-tree " ..... *Cinchonaceæ* 323
Honeysuckle " ..... *Caprifoliaceæ* 323
Woodruff " ..... *Galiaceæ* or *Stellatæ* 325

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Parsley Family ..... *Umbelliferæ* or *Apiaceæ* 331
Ivy " ..... *Araliaceæ* 345
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Mistletoe Family ..... *Loranthaceæ* 347
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Spurge Family ..... *Euphorbiaceæ* 357
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Cucumber Family ..... *Cucurbitaceæ* 350
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ADDITIONS AND CORRECTIONS.

Page vii., for Mr. *William* Hunt and Mr. *R.* Hunt, read Mr. *John* and Mr. *George Edward.*

" 11, line 2, for "perfoliate" read "connate." It is the *stem* that is perfoliate.

" 17, " 5, add Fig. 28.

" 17, " 8 from bottom, for "*hepatica*" read "*strawberry.*"

" 20. Veining of leaves. The feather-veined, fan-veined, and ribbed leaves are varieties of the *net-veined*, the interstices or spaces being filled up with minute net-work. There are only three absolutely different kinds of veining, viz:—1st, the netted, including the feather-veined, fan-veined, and ribbed, as well as the more usual condition, where the veins are irregularly distributed; 2nd, the parallel-veined, nearly confined to Endogenous plants; and 3rd, the forked-veined, found only in ferns and the *Salisburia.*

" 32, line 21. The daisy is one of the family it gives name to, in which the calyx is exceptionally absent.

" 37, line 11, for "*Hydrangea*" read "*Cornus Suecica.*"

" 45, " 14 from bottom. Some families classed as "Petaloid Endogens" have incomplete flowers. See pp. 408—413, and 418.

" 57. Regular and irregular corollas. Certain irregular flowers approach so very nearly to the regular form (as happens in the scarlet verbena), that they might be mistaken for such. The point may be settled by examination of the *stamens*, which in truly regular flowers always bear an exact numerical relation to the petals or lobes of the corolla, and are also perfectly constant in their own numbers. The Verbena, with a five-lobed and apparently regular corolla, has only four stamens, two of which are long and two short; and the Gloxinia, also five-lobed and apparently regular, is found both with four stamens and with five.

" 64, line 3, omit "*petals united.*"

" 64, line 8 from bottom, for "style and stigmas two to five" read "styles two to five, or else five sessile stigmas."

" 65, line 12, after "*Phlox family*, 271," insert "also *Claytonia*, 148, and *Plumbago*, 274."

Page 66, after line 19, c., add—

D. Leaves pinnate, on aërial stems, flowers purplish-red. *Water Septfoil*, 202.

The Water Septfoil is properly and usually a *marsh* plant, but when growing on the borders of ponds, often extends into the water. The Purple Lythrum also (p. 207) is occasionally found in the water.

" 66, line 8 from bottom. "Ovary below the perianth: Trees and Shrubs."

To appearance, the genus Rose (p. 193) and all the species of the Apple family (p. 187) should be placed in this section. But the seemingly inferior ovary of the rose is in reality the urn-shaped calyx, contracted at the upper part, and enclosing numerous free and *superior* ovaries. Similarly, in the Apple-family, the fleshy vase-like calyx is adherent to the backs of the two to five carpels. When the fruits of these plants are ripe, and present their withered perianths and stamens upon the summit, the illusion is even greater than when they were in bloom.

" 70, lines 10—11 from bottom, and p. 71, lines 14—15. In both of these places should have been inserted a reference to the *Gloxinia* family, p. 261.

" 86, after "*Ranunculus aquatilis*" add "*Ranunculus circinatus*, Capesthorne."

" 109. Garden Malvaceæ. Other commonly cultivated species are the *Lavatera* and the *Malope trifida*.

" 110. *Tilia parvifolia*. Tabley Woods. *(Mr. Holland.)*

" 114. In the character of the first division of section B, omit the words "very little branched."

" 117, No. 11. The *Cardamine sylvatica* is only a luxuriant state of the *C. hirsuta*, with the full complement of stamens.

" 121. Add to the list of common garden Cruciferæ, the common cress, or *Lepidium sativum*, sown as a companion to mustard; and the double white Rocket or Hesperis, resembling a stock-gillifiower, but with broadly lanceolate or ovate and serrate leaves.

" 122. *Reseda Luteola*. Lane on the river bank near Statham Pool, below Lymm, plentiful. July 9th, 1859.

" 136. *Rumex Hydrolapathum*. Mobberley, and about Tatton Mere. *(Mr. Holland.)*

" 142, line 9, for "thread-shaped, cylindrical," read "subulate *or* cylindrical."

" 142, " 12 from bottom. There is a variety of the small stitchwort with petals *longer* than the calyx. This may be distinguished from the *holostea* by the sepals being three-ribbed, instead of ribless, and the leaves entire instead of finely ciliated, as in the latter plant.

" 143. *Silene inflata*. Abundant in the waste fields surrounding the new copper-mine at Alderley. *(Miss Hopps.)*

Page 147, add to the list of common garden *Caryophyllaceæ*, the snowy mouse-ear, or *Cerastium tomentosum*, seen everywhere upon rockeries, and distinguished at once by its white herbage.

" 148. Under Portulacaceæ, add, " *Claytonia perfoliata* springs up in gardens not infrequently, as a weed."

" 155, add—

XXXII.*—THE AILANTUS FAMILY. *Xanthoxyleæ.*

A little family of trees and shrubs, chiefly American, interesting as containing that noble tree the *Ailantus*, the pinnate leaves of which are often a yard or more in length. Young specimens occur in gardens, as at Mr. Ferris's, Victoria Park. The Ailantus bears some resemblance to the Stag's-horn Sumach and the Ash, but is distinguished from the former by its nearly entire leaflets, and glabrous twigs; and from the latter, by the large glands underneath the scanty serratures, and the unpleasant odour of the foliage when bruised.

" 156. In the account of the *Polygalaceæ*, insert before Habitats and Localities, " Common milkwort, *Polygala vulgaris*."

" 159, add after the localities of the Sycamore, "A variety with variegated foliage is common in shrubberies."

" 163. *Atriplex deltoidea*, which, like the *angustifolia*, cannot be regarded as anything more than a form of the *patula*, " covers nearly every rubbish-heap on the canal side at Broadheath." *(Mr. Hunt.)* Sept., 1859.

" 163, add—

XXXIX.*—THE RIVINA FAMILY. *Phytolaccáceæ.*

Under shrubs and herbaceous exotics, chiefly from within or near the tropics, and nearly related to the *Chenopodeæ*, from which they are distinguished by having the stamens *alternate* with the sepals, those of the *Chenopodeæ* being *opposite*. Near Manchester they are represented in greenhouses by those very pretty plants the *Rivina* and the *Phytolacca decandra*, the racemes of whose bright red coral berries are singularly gay.

" 167. The *Pimeleas*, among the Thymelaceæ, have only *two* stamens.

" 169, line 17, for " *Rosaceæ*" read " *Drupaceæ*."

" 169, add—

XLVIII.*—THE CALYCANTHUS FAMILY. *Calycanthaceæ.*

A curious family of but half a dozen species, standing between those of the rose and apple, and interesting in its principal representative, the Carolina Allspice, or *Calycanthus Floridus*, a shrub cultivated in gardens at Alderley and elsewhere, and immediately known by its richly-aromatic, chocolate-coloured flowers, formed of numerous sepals and petals, between which there is no absolute line of demarcation, and solitary in the axils of the simple and opposite leaves.

Page 174, add to No. 5 and No. 7, "flowers yellow," and the same to Nos. 17, 18, and 19, on p. 175.

" 174, line 5 from bottom, after "pale blueish," insert "or pale pink, with purple veins."

" 190. The *Pyracantha* is very common about Bramhall and Cheadle Hulme, where it is called "Egyptian thorn." *(Miss Smith.)*

" 196, after line 21, insert under "leaves interruptedly pinnate," &c., "leaves ternate and quinate, green on both surfaces."

" 205. *Wych Elm.* A variety with pendulous branches is exceedingly common in gardens, especially suburban ones.

" 206, line 18 from bottom, insert "petals sometimes absent."

" 209, add, after the *Celastraceæ*—

LVII.*—THE HALESIA FAMILY. *Styracáceæ.*

A little family made interesting by the snowdrop-tree, or *Halesia*, of which there are two or three beautiful and freely-blooming specimens upon the lawn at Cheadle Rectory. The flowers hang among the green leaves like so many snowdrops.

" 224, top line. The Lycium is a tall and slender shrub, with numerous twigs, narrow leaves, and dull purple flowers. It is always planted against walls, and is commonly called "Tea-tree," but has no affinity whatever with the Chinese tea-plant.

" 245, line 7, for "sometimes" read "the lower ones."

" 246, " 21, for "sixteen" read "six to ten."

" 248. *Lamium album.* In a field below Didsbury Church, very abundant. *(Miss Dorrington.)*

" 248. *Ajuga reptans.* A large patch of the white variety, comprising one or two hundred spikes of flowers, on the south bank of Marple Wood, not far from the rustic bridge. May 22nd, 1859.

" 254, line 1st, for "solitary" read "much-branched."

" 262, lines 9 and 10, reverse the places of the words "axile" and "parietal."

" 263, top line. A few of the Fox-glove family, such as the *Torenia Asiatica*, have the anthers similarly locked together.

" 269, line 13. E.B. viii. 513, represents the true or Bardfield oxlip, which does not grow near Manchester.

" 274, top line, for "*vulgaris*" read "*maritima*."

" 282, after the Alpine Enchanters'-wort, add, "Variety *intermedia;* sepals pink, fruit deciduous. Common in the woods about Bowdon. *(Mr. Hunt.)* This pretty plant is probably often overlooked as *C. Lutetiana*."

Page 290, lines 16 and 17. The botanical genus *Cereus* includes species with upright as well as pendulous stems.

" 297, line 11. Occasionally the leaves of No. 4 are much and deeply pinnatifid.

" 305, line 9 from bottom, for " perfoliate " read " connate."

" 312. *Senecio Saracenicus.* Abundant in a field called Blinston's Holes, on the Cheshire bank of the Mersey, in Statham Eye, below Lymm. August, 1859.

" 319, line 9 from bottom, for " numerous " read " ten."

" 324. *Sambucus Ebulus.* Lane beyond Ashton-upon-Mersey church, abundant. August, 1859. *(Mr. Sidebotham* and *Mr. T. Browning.)*

" 324. *Elder.* Mr. Gauthorpe has in his garden in Norman-road, Rusholme, a variety of the elder with the berries, when ripe, of a green colour, like that of " white grapes."

" 336, line 7. The juice is not invariably yellow; in which case the plant may be distinguished from the two following species by its broad, deeply-lobed leaflets, and the long peduncles of the umbels. The former character keeps it distinct from the water cowbane, and the latter from the wild celery.

" 338, top line, omit the Lymm locality, and transfer it to the *Œnanthe crocata*, p. 339.

" 353, line 13, omit the reference to the Botanic Gardens, from which almost all the curious plants mentioned in this volume as cultivated there, have disappeared.

" 400. *Autumnal Crocus.* Abundant in meadows by the river at Didsbury. October, 1859. *(Miss Dorrington.)*

" 402, line 12 from bottom. In the genus *Triglochin* the ovaries are united at first round an axis, from which they detach themselves as soon as ripe.

" 411. *Potamogeton pusillus.* Another form of this plant, commonly distinguished as the *Potamogeton gramineus*, (E.B. xxxii. 2253.) is met with in a few places. Plentiful in the middle ditch in Hale Moss, and in ponds beyond Bowdon Vicarage, on the way to Rostherne. *(Mr. Hunt.)*

" 437, line 6, for " spike " read " raceme."

" 442, " 7 from bottom, for " *repens* " read " *gracilis*."

" 461, " 15. The larch only has deciduous leaves; those of the cedar are evergreen. The latter is further distinguished by their four-sided figure, the leaves of the larch being *flat*.

Page 461, line 5 from bottom. *Abies Canadensis* also ripens its little cones.

" 477. *Polypodium Dryopteris.* In the wood near the moss house by the Wizard Inn, Alderley Edge. *(Miss Hopps* and *Miss Beacall.)*

" 509. *Jungermannia tomentella.* Burley Hurst Wood, Mobberley, abundant and very luxuriant. October 9th, 1859. *(Mr. Holland.)*

References to Drawings in "English Botany."

Page 230.	*Lycopsis arvensis*	should be	XIV. 938.
" 453.	*Carex pulicaris*	"	XV. 1051.
" 487.	*Equisetum Telmateia*	"	XXVIII. 2022.
" 488.	——— *arvense*	"	" 2020.
" 488.	——— *palustre*	"	" 2021.
" 504.	*Hypnum squarrosum*	"	" 1953.
" 508.	*Jungermannia pusilla*	"	XXV. 1775.

References to Drawings in Baxter.

Page 116. *Draba verna* should be 1, 38.

" 404. *Alisma plantago* " 5, 337.

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